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Work for All

IN THE WAR against unemployment — for it is a war — private industry has proved impotent while public agencies so far have been handicapped by lack of funds, by procrastination, by red tape and by lack of vision. Now abdication to charity is being proposed and planned for.

• • • Such a defeatist attitude is unwarranted. There is another way out. A public-works construction program conceived as a national emergency, financed by funds raised by a federal bond issue and prosecuted with war-time spirit and organization is the answer. This course of action is outlined on the first editorial page of this issue.

• • • Public-works construction can make doles unnecessary provided war measures are adopted.

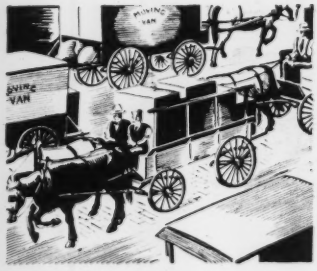
• • • Charity if no other course be open, but work if possible!

September 3, 1931

20 Years *with No Upkeep Expense*

Ross Street, Williamsport, Pa.—Paved in 1911.

ROAD history in Williamsport, Pa., goes back many long years. It takes in corduroy roads, sawdust, stone and cobble streets—all unsatisfactory—and finally brick. It was shortly after 1890 that brick was adopted as the standard pavement in Williamsport. Since then brick has been used almost exclusively. ♦♦ The history of Ross Street is typical. It was paved in 1911. . . To date there has been no expenditure for maintenance. Twenty years of heavy usage without one cent for upkeep! ♦♦ Many other brick pavements in Williamsport laid before the turn of the century are still in excellent condition . . . Because these old brick pavements have given such remarkable service at such a low cost, new paving is done with brick too. . . Constructed with foundations far superior to those of the earlier streets, these pavements give the motorist a new thrill—a sensation of smooth riding which was unknown a decade ago. ♦♦ Modern brick pavements are safe, beautiful and the last word in economy.



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F. E. Schmitt, Editor

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✦

Work for All

SHALL next winter's unemployment emergency be relieved by work or by charity? This question, which we asked two weeks ago in urging public works for relief, is now the outstanding question of the day. The emergency has been brought into sensational prominence by the President's step in organizing nationwide charity relief measures. As yet nothing has been done toward mobilizing increased public works.

The President's extragovernmental organization is a reminder of wartime methods. And in a very real sense we are again at war—fighting to overcome the menacing effects of economic breakdown and win back for all the people the opportunity for self-support. If so, let wartime methods be applied purposefully, by overcoming idleness rather than by compromising with it. The outcome is sure if the fight is pressed intelligently and unitedly. At a time when our national resources have been developed to unparalleled richness it is unthinkable that we should yield to distress, or allow large numbers of the people to be demoralized by charity.

Public works can employ the idle and can make available to them, not by gift but by right of labor, the stores of food, clothing and shelter of which the country has abundance. Private business has proved powerless to maintain the workers at their jobs. The great resource of public work remains.

IS THIS resource sufficient? There are those who say that the great volume of public works required to meet the emergency does not exist, and that therefore we must resign ourselves to the charity plan. They disregard the facts.

Construction needs exist in prodigious volume. The country's annual budget of public-works construction approaches three and a half billion dollars. An addition of little more than twice this amount will give work to five million men at an expenditure of $1,500 per man for labor and materials. Less will do, in fact. Large numbers are engaged behind the lines: the supply, housing and service workers whose employment results from that of the direct producers; construction payrolls need not provide for these. It is quite likely that mere doubling of the volume of public-works construction for a year would provide a job for every seeker.

LET US make the picture specific. Road work alone could take care of the entire unemployment emergency, were no other source of work at hand. More than two million miles of road in the United States still want improvement from the dirt-road stage. Reasonable modernization of but half or a third of that mileage within a year would enlist the service of every unemployed worker. Tools might prove short at the start, but they could be provided.

But such intensive use of a single resource is not necessary. Many roads are remote, and the unemployed have gathered largely in the cities. They can find quite as much work close at home.

Cities can make available a vast total of urgent work—street widening and paving, modernization of public buildings, sewer and water improvement and the bettering of medieval conditions in dozens of directions. If nothing more were done than to safeguard, reconstruct and render decently habitable the notoriously unfit institutional buildings throughout the land, it would absorb a large contingent of the idle.

In brief, the volume of needed public works is ample to provide the employment by which the emergency can be met in full. Every state, county and city has its quota. There is federal construction also, but this is only a tenth of the country's annual public-works budget. The great bulk of emergency construction will come from the states and local communities.

WE ARE not forced to depend on charity, then. We can *work* our way out.

And the means are available. We lack neither money nor the ability to organize and plan quickly. The difficulties are great, but they can be overcome.

Financing is probably the greatest. Heavy tax burdens and local bond obligations throttle the public work of local communities. Cities are poor; tax collections are far behind and bonding margins are small or absent. But financing is easily accomplished through the superior ability of the federal government to market bonds. Loans of far greater proportions were sold to the people during the war. A reconstruction bond issue can quickly provide all the money needed, whether it taps the huge accumulation of idle investment funds through the banks or is distributed countrywide to the people.

Nor do the problems of organizing and planning surpass the nation's powers. No one who recalls what was done in 1917 and 1918 in carrying out in a few months a vast building and equipment program and putting the country to work for national purpose will have any doubt of our present powers. Engineers are more numerous and competent, constructors have doubled their achievements. Organizational and administrative skill is ready.

A NATIONAL emergency lies ahead, but a national spirit and united purpose can carry us through by work in place of charity. Time is vital, or winter will find us unprepared. But if the will to provide it be strong enough, work can be found for all.

EDITORIAL NOTES

Prevailing-Wage Delays

EVIDENCE of the difficulties of determining prevailing rates of wages continues to accumulate. In Illinois, under the new state law, wage schedules determined by the division of highways are being vigorously attacked by union labor, which has invoked the action of the governor's appeal board to secure increased rates. In the District of Columbia, where the Bacon-Davis federal law prevails, the controversy with contractors for government and district building work moves on toward final submission to a Department of Labor not anxious to be involved directly in the dispute. In both cases, in the last analysis, the fight is that of organized labor to establish the ruling that union wage scales are prevailing wages. Without argument at the moment on the main question, the fact is evident that delays and disturbances to employment in public-works construction are being created. In Illinois, road work advertised for bids on Aug. 18 and 24 and postponed to Sept. 1 and 8 has been again postponed to Sept. 15 and 24; some $7,500,000 of work is now delayed. Delay is the inevitable result also of the federal buildings wage dispute in Washington. Comment beyond the facts stated is hardly necessary. Prevailing-wage legislation has been a faulty device to meet a situation that could have been forestalled.

Can Delay Be Prevented?

DELAYS to the progress of work are so numerous that any addition in their number, however minor in scope, is unfortunate. Maintenance of wage rates is of high importance—this view stands as strong today as at any time within the year. But where such clumsy and retrograde devices as laws to control public-works wages must be invoked the losses are apt to outweigh the gains. In view of the disconcerting practical effect of the laws, it appears essential that the authorized officials after once determining a wage rate should hold their ground firmly and refrain from reconsidering and postponing the start of work merely because someone protests. Prevailing wage rates are not susceptible of mathematically precise determination, but involve sound judgment in addition to a knowledge of the facts. The intent of most of the wage laws no doubt is to require that *fair current wages* be paid, but a fair wage does not necessarily mean one that is satisfactory to everybody. If work must wait until everyone approves of the wage rates established and no protests remain, it may be delayed forever, in which case the whole commonwealth is the loser. The duty of the officials, then, is to act on adequate data, make a decision and stick to it. If the law says this may not be done, it would appear that the law is defective.

Controlled Concrete

IN THE rapid and successful spread of concrete control methods, much detail study has proved necessary to take account of the various practical factors by which the result may be affected. One of these factors, moisture variation in the sand, and its effect on both consistency and batch volume, is susceptible of being dealt with by the ingenious method which T. C. Powers describes this week. The procedure set forth will engage the close attention of all who have to direct large central-mixing operations. But in part the value of the article lies in the fact that it draws further attention to the essential importance of controlled-concrete practice in present-day concrete work. The field of the arbitrary mix appears to be steadily narrowing. Such faults as controlled-concrete practice showed in its earliest period have been overcome, particularly the early failure to give full consideration to workability and placeability, and it is now thoroughly well adapted to the requirements of its special field, the field of variable materials. Where materials are uniform within a narrow range, fixed proportioning may long retain its simplicity and convenience, subject to check for economy and efficiency by examination of water ratio and workability.

Extending Hydrologic Knowledge

HOW much can be added to our limited knowledge of rainfall, floods and droughts by study of historical material finds new and remarkably interesting illustration in a monograph just published by the Metropolitan Water District of Southern California, containing the report of special studies made for the district by H. B. Lynch. It carries the 80-year-old record of rainfall measurement back another eighty years, by analysis of information gleaned from the writings of travelers, the crop records and weather notes of the Mission padres, lake-level observations and similar scattered material. Surprisingly concordant and dependable values could be constructed from these data, and conclusions could be drawn that go quite beyond anything learned from the record of measured values. Thus, periods of both water excess and deficiency were discovered, greater than those of recent decades; a 28-year and a 41-year drought period were found; a hundred years ago there was ten-year dry period more severe than any observed since; historically, the present water deficiency cannot be considered a major shortage. Such conclusions, obviously of utmost value in their bearing on the great water-supply problems now being worked out in that region, are full justification for the patient and often baffling labors of historical study. Its successful use in European hydrology heretofore, as well as the southern California example, suggests that it may have far wider application to American regional hydrology.

Sewage, Borers, and Marine Design

AN UNWELCOME corollary of the present movement to reduce the pollution of the waters in and around New York harbor is the possibility of enlarging the range of activity of teredos. At present the harbor waters are free from the activities of marine borers, and unprotected timber is used widely for marine structures and pier foundations. Freedom from attacks by borers is ascribed generally to the polluted condition of the harbor waters. The present program of sewage treatment calls for restoration of relatively clean water conditions within less than a generation. If this condition leads to an increase in marine parasites ten or even twenty years hence, the danger must be taken into consideration in any new construction. New York's new piers for 1,000-ft. liners, for example, are to be built upon untreated wood piles. Treating the thousands of piles required for that work would about double their cost. Is the risk of having them destroyed by borers ten or twenty years hence sufficiently great to warrant the added expenditure? The question is one to be given serious consideration—not only by the dock department but by the many private owners of waterfront structures.

Professional Solidarity and Separate Licenses

RENEWED faith in the desirability of registration for engineers was expressed by the board of direction of the American Society of Civil Engineers at the summer meeting of the society. We feel sure that in this statement the board reflected the views of the majority of the civil branch of the profession.

But the board went farther. It asserted its belief that the solidarity of the engineering profession hangs upon having but one registration for all engineers: that separate licensing of civil, or mechanical, or structural engineers would mark the beginning of the disintegration of the profession into trade unions. Here, we believe, it entered questionable ground. It wrote into a solemn resolution all the stock arguments against "splitting up the profession" by separate licenses, and stated that the American Society of Civil Engineers subscribes to this resolution, although the society's membership had no chance to vote on the matter.

On only one point did the board fail to give full support to the believers in solidarity through registration laws. After enunciating the reasons why all engineers should be included under one license without distinction, the board concluded by recognizing the necessity, when existing laws restrict members of the profession from practice, of making such concessions as may be necessary to enable members to practice, "by providing for their registration as *professional engineers with special qualifications.*"

Turn back to what the same board did at its spring meeting. It was then considering the report of a joint committee on the conflict between the architectural and the engineering professions due to overlap in building work. The committee had recommended that engineers specialized in building work be licensed as "Professional Engineers (Structural)." In spring the board turned that recommendation down. In summer, however, it indorsed the very thing which it had disapproved only a few months before!

But the case is far broader than a mere question of consistency. It is concerned with fundamental obligations of the engineering profession. Registration and license laws have the function of protecting life, health and property, not to make engineering a closed corporation or to foster professional solidarity. The state has no interest in professional solidarity. Such being the case, if greater protection can be afforded to the public by a special license for structural engineers, electrical engineers or sanitary engineers, the profession should be first to recommend these special classifications. The possibility of their "splitting up the profession" should not be considered.

The profession already is split into four major groups, and a common license for all engineers will not reunite them. There must be other reasons for objecting to separate licenses. What are they?

First, the board states that "jurisdictional disputes will ensue." The statement is made without a blush! When the caliber of the engineering profession gets so low that jurisdictional disputes arise it will have ceased to be worthy of the name. The same reflection applies to the bugagoo of trade unionism .

Again the board says, "Registration laws should recognize the fact that *all engineering practice is the application of common basic knowledge.*" A fine platitude, this. Is the same basic knowledge involved in the design of a bridge, an electric generator and a water-purification plant? Are we on firm ground when we argue that because John Jones, a specialist in bridge design, back in the dim past studied a little about electricity he should be authorized by law to design and build electric elevators? By no means. If question is raised as to the need for a special license for electrical engineers, as it has in the case of structural engineers, the engineering profession should be the first to say that only men *qualified* to design electrical equipment should receive a license to do so.

And finally, "if the various subdivisions were to be separately recognized and removed from the general practice of the profession, in time there would no longer be an engineering profession but instead a large group of specialists no one of whom could be competent to manage, direct and conceive engineering projects to their entirety." Is there any reason why the chief engineer of a city water-supply department, whatever the form of his license, should not conceive and direct the construction of a great water-supply system like that of San Francisco, involving as it does the building of hydroelectric power plants? Obviously he will not attempt to design the electrical equipment; he would not do so even though he held a blanket license. Instead he will call in an electrical engineer. Ability to conceive, to plan for and to administer a great engineering undertaking is not inherent in any one of the branches of engineering, nor will the mere requiring a man to take out a license in one or more of the branches in which he has specialized deprive him of that ability or the right to exercise it. California licenses only civil engineers and Illinois only structural engineers. Has their right or ability to conceive and direct great engineering undertakings been limited thereby?

In this patently trivial reasoning, the Civil Engineers' board does not recognize and express its public obligations, but argues narrowly—and mistakenly—for professional self-interest. Mistakenly, because the profession will always find its best interests in that which will enable it to serve the public best. Narrowly, because the views expressed are founded not in fear that the profession may disintegrate but in fear that some of its organizations may prove to be superfluous.

Professional societies that cut across all technical groups depend for their support on sustained interest in matters professional rather than technical. Those who have developed these societies see their only hope for continued existence in having *all* engineers licensed to practice under a common license. Separate licenses mean separate groups with diverse professional interests. The technical societies themselves view with no little concern the growth of the specialist groups, and have attempted to hold them within the fold by setting up technical divisions. Separate professional interests added to separate technical interests foster an inclination to cut the bonds which bind these growing groups of specialists to the parent society.

It is regrettable that the highest representatives of the civil engineering profession should stand on the narrow ground of self-interest and ignore the paramount considerations of public interest. We grant that the welfare of the profession's own organizations is important, but it has no place in the discussion when public safety is the primary issue. Solidifying the profession and upholding its organization is a separate campaign. At the present juncture the task of providing maximum protection to the public should not be compromised by half-hearted attempts to serve self-interest.

Large Suburban Terminal Built for Illinois Central Railroad

Station for Chicago electrified suburban service is built into steel framing of new viaduct, making a triple-deck structure

A SUBURBAN TERMINAL independent of and distant from the main-line terminal station is an unusual arrangement of passenger terminal facilities possessed at Chicago by the Illinois Central Railroad, which operates a heavy suburban business. Reconstruction of this station, including the lowering of its tracks, is necessitated by extensive municipal improvements along the lake front and is combined with the reconstruction of the Randolph St. viaduct. This viaduct, 128 ft. wide and replacing an old narrow structure, crosses the railroad and extends to the lake, forming an approach to the new outer-drive bridge, as indicated in Fig. 1. That part of the new viaduct that spans the company's property is being built by the railroad according to designs prepared by its engineers and approved by the city authorities and by the South Park Commissioners. The viaduct, in fact, will form the structural framing, its deck being the roof of the station building, the floor of which, in turn, will span the tracks and platforms.

The railroad handles the largest share of the Chicago railway suburban business, and in 1930 it carried nearly 40,000,000 suburban passengers, of whom a considerable proportion used the Randolph St. terminal. A maximum of 587 trains has been operated regularly in and out of this terminal during the 24-hour period, with a rush-hour peak of 79 trains in and out. Included in the above daily total are 80 interurban trains of the Chicago, South Shore & South Bend Railroad. All of the equipment entering this terminal is electrically operated. From the plan (Fig. 1) it will be seen that the suburban tracks pass around the main passenger station at Roosevelt Road and extend 1.4 miles beyond it to their own terminal at Randolph St., which is convenient to the central business and shopping district and also to the similar district now developing north of the Chicago River. There is an intermediate station at Van Buren St., between the main passenger terminal (Central Station) and the suburban terminal.

The old suburban station was on the same site, but at street level. About five years ago the work of reconstruction was begun, and a temporary station was established south of the old location. The site was then excavated and a concrete deck slab laid at the new grade, the sides of the pit being held by steel sheeting with heavy timber shoring. During the progress of this work it became evident that it would be desirable to have a wider viaduct than that contemplated in the ordinance under which this project was being carried out. This condition led to further negotiations, which culminated in the passage of an amendment to the ordinance, late in 1930. In the meantime, four of the permanent tracks were laid, and a small temporary station was constructed north of the site of the permanent station. These four tracks are now used in conjunction with the six tracks of the larger temporary station constructed south of the viaduct in 1926. The construction work has been carried on without interference with traffic. Typical features of the design are shown in Fig. 2. A double-deck structure is formed by the viaduct framing for a distance of 252 ft., while for 61 ft. of this distance there is a triple-deck arrangement. The foundations consist of concrete caissons sunk in open wells to rock at a depth of about 90 ft. below city datum. The normal viaduct design consists of rows of six caissons supporting six columns, but the existence of an adjacent building, a street and underground utilities made it necessary to use only four caissons in some bents. Massive concrete cantilever girders on the outer piers then support the outer walls.

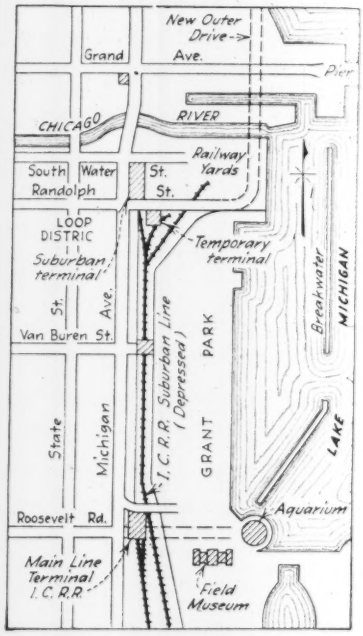

Fig. 1—Main-line and suburban terminals

Suburban line extends 1½ miles beyond main-line station to separate terminal.

This viaduct is of heavy steel construction, with H-beam columns carrying the two tiers of framing for the station floor and the viaduct floor, both covered with poured concrete slabs. Unsymmetrical arrangement of columns at both levels, due to track curvature and other conditions, as well as the elimination of certain columns noted above, necessitated special arrangement of the framing and the use of girders and reinforced I-beams in some of the longer spans. Furthermore, at some points the absence of columns in the lower level made it necessary to carry the framing of the station floor by hangers attached to the viaduct framing above. Silicon steel is used in about half the columns. All steelwork is incased in either poured concrete or gunite.

As the station is directly under the viaduct, it is specially important to have the upper deck watertight and to prevent any seepage from getting through. Waterproofing membrane protected by asphalt plank was laid on the concrete slab, but waterproof expansion joints constituted a special problem, which was solved by the construction shown in Fig. 4. The 2-in. joint is faced by a heavy angle on each side, one angle being bolted to a base plate on the steel framing and the other being free to slide on this plate. This 2-in. space is filled with an elastic composition that is flush with the surface of the sidewalk but does not extend to the top of the joint space in the roadway, leaving room for its expansion vertically. The opening or slot in the paved roadway is covered by a steel plate that is fastened to the framing

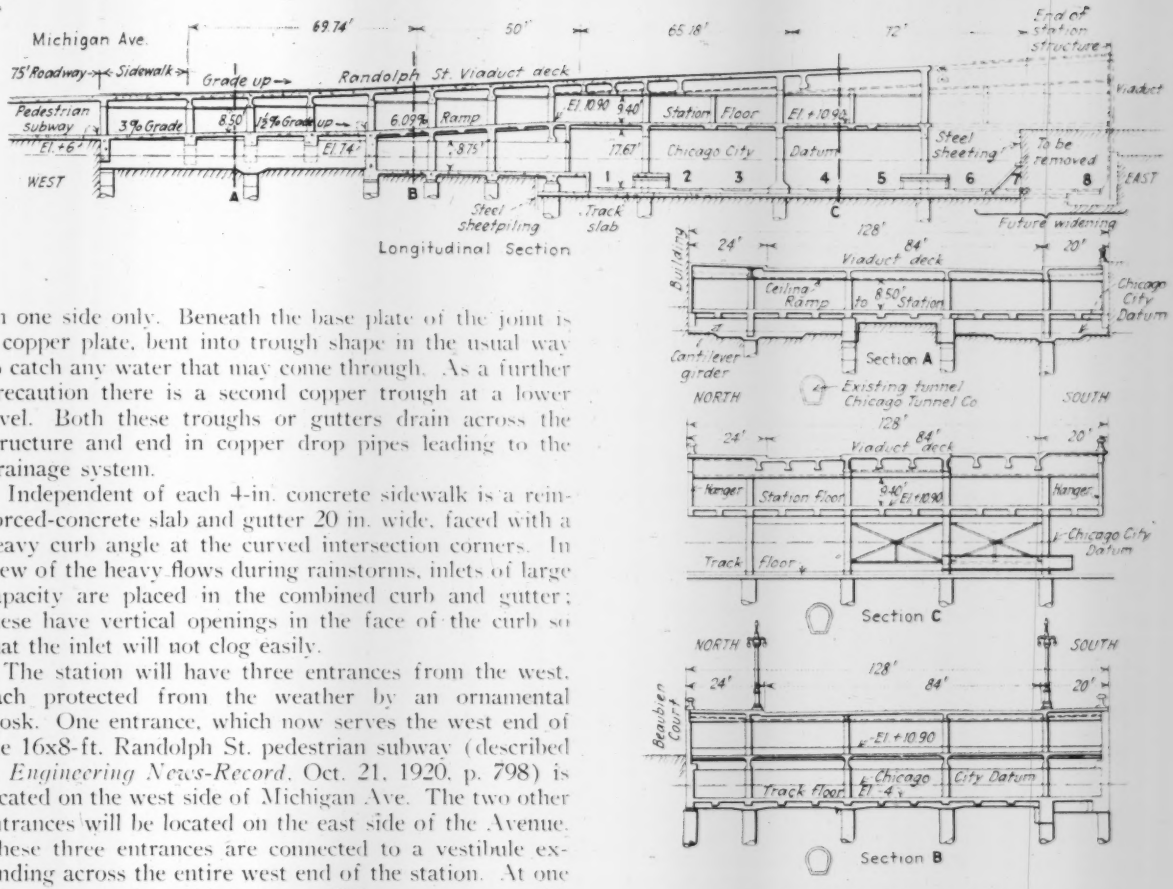

Fig. 2—Triple-deck station structure

Viaduct floor forms roof of station, which in turn spans tracks and platforms.

on one side only. Beneath the base plate of the joint is a copper plate, bent into trough shape in the usual way to catch any water that may come through. As a further precaution there is a second copper trough at a lower level. Both these troughs or gutters drain across the structure and end in copper drop pipes leading to the drainage system.

Independent of each 4-in. concrete sidewalk is a reinforced-concrete slab and gutter 20 in. wide, faced with a heavy curb angle at the curved intersection corners. In view of the heavy flows during rainstorms, inlets of large capacity are placed in the combined curb and gutter; these have vertical openings in the face of the curb so that the inlet will not clog easily.

The station will have three entrances from the west, each protected from the weather by an ornamental kiosk. One entrance, which now serves the west end of the 16x8-ft. Randolph St. pedestrian subway (described in *Engineering News-Record*, Oct. 21, 1920, p. 798) is located on the west side of Michigan Ave. The two other entrances will be located on the east side of the Avenue. These three entrances are connected to a vestibule extending across the entire west end of the station. At one side of the main waiting room will be a concourse with stairways to the platforms 15 ft. below. In view of the heavy traffic at rush hours and on holidays, the ticket offices will be arranged so as to give an exceptional freedom of movement. For the same reason special door arrangements have been devised for ready control of the crowds.

The station is heated by a hot-air system, which will be used also for ventilation, but with an unusual supply of air from underground, as the Chicago Tunnel Co. has tunnels located in Michigan Ave. and in Randolph St. These are small electrically operated freight tunnels with tracks about 45 ft. below the street level, so that the air in the tunnels is relatively cool in summer and warm in

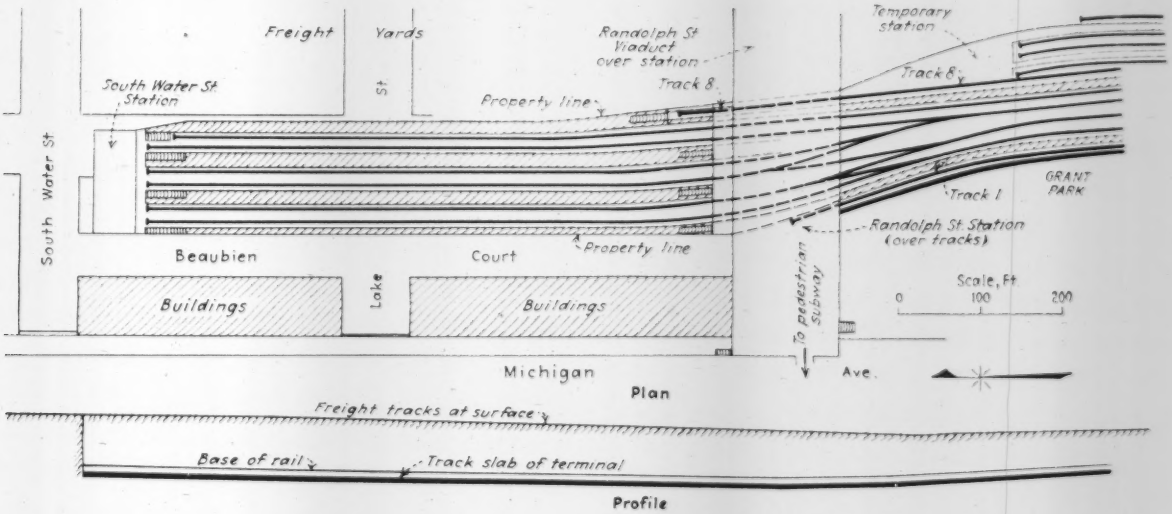

Fig. 3—Layout of suburban terminal

Plan shows final development with eight tracks, but only five are to be laid now. Present temporary station has six tracks.

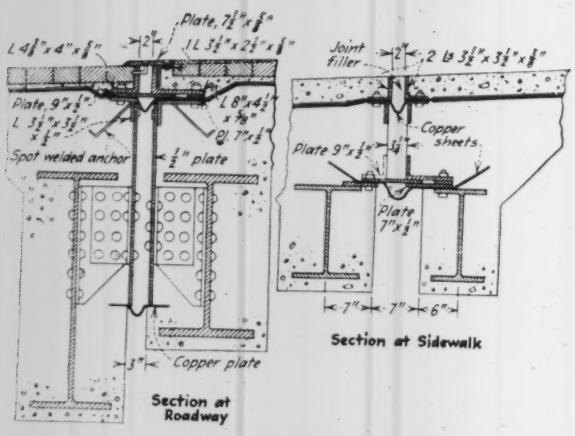

Fig. 4—Expansion joint prevents leakage into station

winter. The heating and ventilating system of the station has a large duct connecting to the tunnel and also an independent fresh-air duct extending above the surface of the park. A connection between these two ducts is controlled by dampers, so that the relatively warm air from the tunnel can be used in the winter for heating purposes and cool air from the tunnel can be used in the summer time to reduce the temperature in the station.

As shown by the general plan, Fig. 3, the new station tracks will extend between Randolph St. and South Water St., a distance of about 800 ft., parallel with and only about 120 ft. from Michigan Ave., one of the city's most heavily traveled thoroughfares. The tracks are depressed. The main station facilities will be at the Randolph St. end, as described, but supplementary facilities at the South Water St. end will accommodate passengers to and from the growing district north of the river. This terminal ultimately will have eight station tracks, six tracks extending between Randolph and South Water Sts. and two tracks beginning south of Randolph St. Each of these eight tracks is to be approximately 800 ft. long and can accommodate a train of ten cars.

The six tracks north of Randolph St. are in pairs, 16 and 27 ft. c. to c. alternately, with two island platforms 16 ft. wide and two side platforms 15 ft. wide. The station tracks converge into a four-main-track suburban system, and the throat will have a large number of crossovers, which will provide unusual flexibility of movement between the running tracks and station tracks. Initially it will be possible to construct only five of the eight station tracks. The remaining three tracks will be constructed in connection with some future rearrangement of facilities, which probably will be made in the next two years. As all trains are electrically operated, the terminal will have an overhead catenary contact system carrying 1,500-volt direct current.

The new suburban terminal was designed under the direction of D. J. Brumley, chief engineer of Chicago Terminal Improvement, Illinois Central Railroad, and C. H. Mottier, engineer of design. The plans had to be approved, however, by the city authorities and the South Park Commissioners. It is probable that air-right structures will be built eventually over the terminal and over the railroad property between this terminal and the river, but this development has not reached the stage of definite planning.

Specifications for Slag for Trickling Sewage Filters

FIELD INVESTIGATIONS of filter beds composed of crushed blast-furnace slag and sodium sulphate tests of samples from the beds have led to the conclusion that the material is a durable one for sewage filters, according to a report made to the National Slag Association, Cleveland, Ohio, by Charles C. Hommon, consulting sanitary engineer, Canton, Ohio. Nearly 50 sewage-works, including some using other filter media, were investigated by Mr. Hommon. Data regarding the media at each sewage-works are tabulated in the report, which also contains a discussion of sewage filter media in general and slag in particular, including information as to the production of slag and its preparation for use in sewage filters. Specifications for furnace slag for sewage trickling filters are suggested by Mr. Hommon as follows:

Filtering material shall consist of crushed blast-furnace slag having angular, roughly cubical fragments. The slag shall be furnished by a reputable producer fully equipped with crushing and screening facilities sufficient to assure the production of the material as specified and in such quantities as will be required for the prompt execution of the contract. A thorough inspection of the plant facilities and of the finished product shall be made by the engineer before final approval.

Sampling—From the finished product (stockpile, bin or car) the engineer shall select for the required tests a representative sample of slag of the size to be used in the filters. The slag shall meet the following requirements:

Durability—The durability of the material shall be determined by twenty cycles of the sodium sulphate test prescribed by the American Association of State Highway Officials, (U. S. Dept. of Agriculture Bulletin 1,216, p. 9-28) except that the sample shall consist of 50 or more pieces of slag of the size to be used in the filters. The following conditions of test shall govern:

1. Any piece of the material shall be considered as having failed which registers disintegration: (a) by splitting into three or more pieces; (b) by crumbling to such an extent that there is 10 per cent fine material (by weight) passing the No. 4 sieve (sieve opening 0.187 in.)

2. Any sample registering failure in excess of 10 per cent of the pieces tested shall be considered of doubtful soundness, and the test shall be repeated on a new sample. A second doubtful result will justify rejection of the material.

Metallic Iron—All slag aggregate, after crushing, must be passed over a magnetic separator at the slag plant, in order to remove pieces containing metallic iron.

Size and Gradation—The material shall be graded within the following limits as indicated by round-hole laboratory screens:

1¼ to 2½-in. size:	Passing 2½-in. screen—	95-100 per cent
	Passing 1¼-in. screen—	0-5 "
	Passing ¾-in. screen—	0-2 "
2½ to 3½-in. size:	Passing 3½-in. screen—	95-100 per cent
	Passing 2½-in. screen—	0-5 "
	Passing 1 in. screen—	0-2 "

The 2½- to 3½-in. size is recommended, but the engineer may choose and write into his specifications either of the above sizes.

Method of Placing the Aggregate—The material shall be placed in the filter in such a manner as to preclude (a) the formation of fines through breakage, and (b) segregation through improper handling.

Panama Makes Rapid Progress in Road Construction

Nearly sixteen millions spent since 1921—850 miles of road completed—A loan to complete national system now being sought

THE NATIONAL HIGHWAY of Panama, which eventually will extend from the Costa Rican border to the frontier of Colombia, has been under construction since 1921—intensively since 1928. For the first few years funds for the work were derived from current revenues that were later supplanted by proceeds from loans. Since the start of the work more than $15,800,000 has been expended, and 850 miles of road have been constructed. Revenues from the levy of an 8-c. a gallon tax on gasoline, plus 25 per cent of the automobile registration tax, will prove sufficient to keep the work going until the end of this year. The rainy season in Panama lasts from May until December, and work now is going on at a reduced rate; about 1,500 men are at work, as compared with a total of 4,500 to 5,000 during the dry months of the year.

When the $12,000,000 loan was made, three years ago, the Panama road board planned to use it in road construction at the rate of about $500,000 per month. A slower rate was decided upon; and instead of drawing the full amount in the first ten months, the board only drew the last $100,000 May 28, 1931, more than 30 months after it had been made available.

Of the original $12,000,000, $1,092,745 was devoted to the purchase of equipment and to the improvement and completion of roads that were already under construction at that time, including a short section of 12 miles between Chorrera and Arraijan. This new section, when connected to Panama by a new ferry service and by the Thatcher Highway now being built by the United States government in the Canal Zone, will give easy access to the highway system of the interior, which may now be reached only through a long and tortuous road.

About $4,000,000 from the proceeds of the loan were used to build a new highway 155 miles long from Santiago de Veraguas to David. The highway parallels the main Cordillera, crossing many spurs from the main range and a great number of rivers, some of considerable size. The drainage of the highway proved particularly costly, and the grading was very heavy. Forty-one bridges of a span of 65 ft. or more were required, with 48 additional single-girder bridges ranging in span from 20 to 40 ft.

The foundations of the San Pablo bridge, which has a main span of 380 ft. with two approach spans of 80 ft. each, were sunk by compressed air 40 ft. below ground and 30 ft. under water. The Fonseca bridge has a main span of 400 ft. with two 80-ft. approaches. The Tabasara bridge has two 225-ft. spans, and the Santiago bridge has a 260-ft. span. The aggregate length of the steel bridges required in the construction of the new highway is 6,460 ft., and they required a total 3,900,200 lb. of steel. An old suspension bridge of 400-ft. span over the Chiriqui River has been reconditioned and will be replaced later by a new bridge 560 ft. long.

Progress of the national highway system of Panama

Grading was light in some sections and very heavy in others, reaching a maximum of 44,000 cu.yd. per mile. The total volume of excavation amounts to 2,100,000 cu.yd., about 10 per cent of which was in rock. In addition, 43,000 cu.yd. of additional excavation was made for bridge abutments and other structures. The surfacing, principally treated macadam and gravel, amounts to 102,000 cu.yd. Concrete was poured to an aggregate amount of 23,500 cu.yd., and reinforcing steel weighing 1,308,000 lb. was used. Nearly 11 miles of corrugated pipe have been used for culverts, and the new fences for the right-of-way total more than 105 miles in length. Eighty per cent of the road is completed. The most modern and up-to-date machinery for the construction of highways is being used, including power shovels, tractors, graders, scrapers, crushing plants, gravel plants, etc. The estimated value of the mechanical equipment now in use on the project by the board is more than $1,000,000.

These data are furnished by Thomas Guardia, chief engineer, Central Road Board of Panama.

Concrete Walls for Earthquake Bracing of Tall Buildings

Comparison shows economy of 6 per cent total cost of 30-story building over steel portal bracing—Designs based on high shear and bond strength existing in concrete and not ordinarily used

By NORMAN GREEN
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SUBSTANTIAL ECONOMY in designing earthquake-resistant construction for tall buildings can be effected by using rigid reinforced-concrete wall bracing in place of the usual steel portal framing. Actual design comparison for a 30-story frame indicates a saving of at least 6 per cent on the total cost of the building by the use of rigid wall bracing. Study of this building design problem is of particular economic and structural importance on the Pacific Coast because of the increased consideration given to the earthquake hazard combined with the increasing height of buildings.

Efforts have been made to avoid the great cost of a stiff bracing system by use of a flexible first story, within which horizontal motion is assumed to be absorbed. This design offers serious uncertainties because of the unknown amplitude of the earth motion and the possibility of resonance. The design study outlined in the following, therefore, is based on the rigid type of construction and extends the use of concrete wall bracing (which has been used in a modified form for low buildings in Japan) to the design of tall buildings.

For the purpose of comparative design a horizontal ground acceleration of $g/10$ is assumed. This was recently adopted by the Board of Fire Underwriters of the Pacific as giving an adequate degree of safety, and it is the seismic factor required by the Metropolitan Police Board of Tokyo. It is not considered excessive by Japanese engineers, for the Nippon Electric built a four-story steel-frame factory in 1926 using a $0.15g$ factor, and the eight-story Yaesu building was designed for an acceleration of $0.2g$.

Steel Portal Type

The building assumed for the present comparative study is 100 ft. square in plan, 30 stories high, with basement, of steel-frame office type, with uniform square panels of 19 ft. 2 in. The first story is 20 ft. high, and the others are 12 ft. Beam-and-slab floor construction was used, with 13-in. brick curtain walls. Wind and earthquake stresses were computed by Fleming's portal method, and all lateral force was carried to exterior wall bents. As a basis for estimating the percentage of cost increase due to bracing against earthquake force, the normal cost was taken as 70c. per cubic foot. The increased cost is made up of two parts: the increase in the structural steel, which was taken at $85 per ton erected, and the additional concrete for spandrel beam and wall column fireproofing necessitated by the larger size of these members.

Three designs for this frame were made: (1) without lateral bracing; (2) braced to resist a 20-lb. wind pressure; (3) braced to resist an earthquake producing a lateral force of 0.1 g. The results, shown in the accompanying table, indicate the almost prohibitive increase in steel tonnage for an earthquake-resistant design of the conventional portal construction, and they form a basis for the subsequent comparison with rigid wall bracing.

Reinforced-Wall Type

In the proposed method of rigid wall bracing for this building the exterior wall from the second floor up is designed to act as a unit in resisting lateral forces. The windows divide it into a frame with vertical and horizontal members. Since the first story is much higher than the others and usually has the alternate piers omitted, it is more practicable to carry the lateral shear into the structural-steel frame at the second-floor line and to neglect the stiffening effect of the walls below this point. However, it should be noted that the stability of the structure is not made dependent upon any flexibility in the first story or basement, as they also are designed for the lateral force of $0.1g$. The steel frame above the second floor is designed to resist dead and live loads only.

So far as the writer is aware, the following suggested method of resisting wind and earthquake forces by shear stress in the wall masonry has never been seriously investigated for the higher type of buildings. This neglect may be attributed partly to the fact that very low diagonal tension and shear stresses are employed in ordinary concrete design and that the possibility of developing far higher stresses is not generally recognized..

Design Discussion—The exterior wall design at the second story, where the stresses due to lateral load are a maximum, is shown in the accompanying drawing which includes details of the pier and spandrel sections and a tabulation of stresses. Window area is 23.3 per cent; this compares with 25.2, 24.6, 23.6 and 29.3 per cent in four buildings in San Francisco averaging 25 stories high.

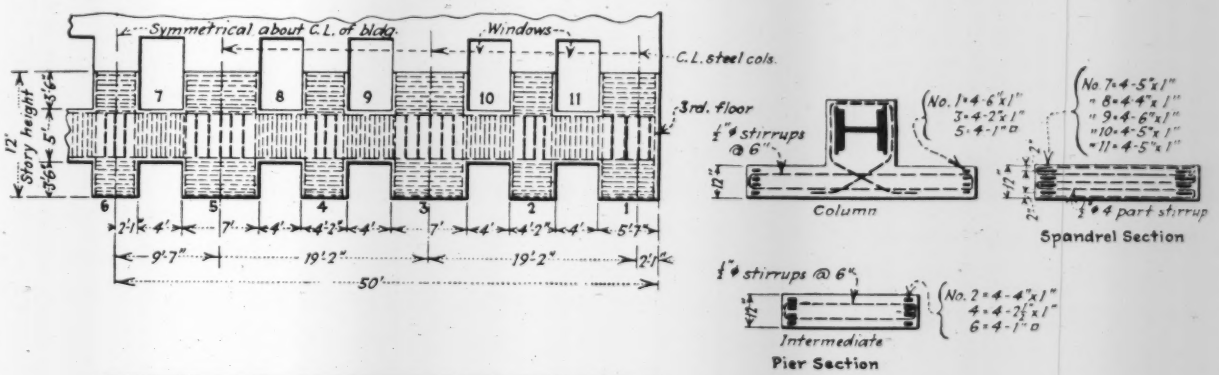
Shears and direct stresses in the columns and shears in the girders, computed for the earthquake force of $0.1g$, were based on the following: (1) Points of contraflexure in the piers occur at mid-height of the windows. (2) Direct stress in the piers due to overturning varies directly as the distance from the center of gravity of the wall section taken through the points of the contraflexure of the piers, and as their sectional areas. (7) Lateral shear carried by each pier in the wall is directly proportional to its sectional area.

For the reinforcing (Fig. 1), flats have been used in general rather than squares, since the large number of the latter required would occupy too much space. The wide members give a great length in which to develop bond, and the splices need develop only about 50 per cent of the capacity of the bar. For the larger bars, a lapped

splice with fillet welds probably would meet the requirements best, while for the smaller flats and squares the lap would be increased and the welds omitted. Structural columns with fireproofing cast integral with the piers are considered to act as pier reinforcing, and the entire combined section is employed in computing shears and direct stresses. The structural spandrel beams, however, which in general would be very eccentric on the wall, are not considered as a part of the wall reinforcing.

Unit Stresses—The practicability of this method of construction depends largely upon the maximum unit stresses permitted in the design. For steel there is no permanent injury until the yield point has been exceeded, and it is therefore proper to consider 40,000 lb. per sq.in. bars gave computed bond stresses at failure ranging from 301 to 642 lb. per sq.in. While a few tests indicate a somewhat lower bond resistance for flats than for rounds or squares, there is very little information on the subject. Tests at McGill University (1927), in which only the top flange of an I-beam was incased, gave computed bond stresses of from 400 to 500 lb. per sq.in. at bond failure. In these tests the bond stress must have been due entirely to adhesion, since there could have been little if any gripping of the steel by the concrete.

The steel stress has been kept below 40,000 lb. per sq.in. The maximum compressive stress in concrete is 2,100 lb., which would require a 3,500-lb. concrete. Since earthquake shocks occur at very rare intervals, it is considered reasonable to assume that the concrete will be six months old before it receives full load.



Kind of Stress	Maximum Pier Stresses						Maximum Spandrel Stresses				
	1	2	3	4	5	6	7	8	9	10	11
f_s	30,700	37,500	33,800	36,000	31,000	30,800	34,500	36,000	37,000	35,000	31,300
f_c	1,345	1,290	1,230	1,072	1,320	880	1,700	1,800	2,100	1,760	1,370
v	500	260	300	254	268	250	800	725	690	435	330
v_1	52	68	149	105	201	184	200	217	148	108	83
v_2	103	102	214	158	200	169	526	Very small			

f_s = *Tensile stress in steel*
f_c = *Compressive stress in concrete*
v = *Diagonal tension stress in concrete*
v_1 = *Bond stress on that portion of main bars within the pier or spandrel*
v_2 = *Bond stress along the intersection between pier and spandrel*

Shear Distribution to Piers				
Pier Nos.	Ratio Bend. Defl. to Shear Defl.	Load in Kips From Total Defl.	Load in Kips From Shear Defl.	Per Cent Error
1	0.36	337	317	6
2	0.435	131	130	1
3	0.390	371	357	4
4	0.595	118	130	10
5	0.457	354	357	1
6	0.816	101	130	29

Stresses and structural details of rigid wall bracing for earthquake resistance

as the limiting stress for all loads, including the assumed earthquake force. Concrete compressive stress should be limited to about 60 per cent of the ultimate, since numerous tests by Bach and others show that for many repetitions of stress there is no increase in maximum deformation or other evidence of permanent injury up to this limit.

Consideration of diagonal tension, which, together with bond, is the controlling element in this design, cannot be taken from the results of ordinary beam tests, since the ratio of span to depth for the piers and spandrels is very low. Although it is known that diagonal tension resistance in a concrete beam increases rapidly for low values of this ratio, few tests have been made on short and deep beams. Tests at the University of Illinois (Bulletin 166) indicate a shearing stress of 800 lb. in the concrete for beams of 4.5 length-depth ratio. Also, tests carried out for the Emergency Fleet Corp. (*ENR*, Feb. 27, 1919, p. 430) showed shear stresses for a 3.3 length-depth ratio from 1,340 to 1,963 lb. for 0.8 and 3.2 per cent of vertical web reinforcement, respectively. These investigations indicate the relatively high concrete shearing stress developed in beams of low length-depth ratio.

Regarding bond stress, the best available data are presented in Bulletin 71 of the University of Illinois. A series of 30 tests of beams reinforced with 1-in. round

For calculating diagonal tension stress the length-depth ratio for the spandrels is 0.8 and for the piers from 2.1 to 3.7. On the basis of the tests quoted at least 1,000 lb. of shear resistance can be developed by the use of 1 per cent of web reinforcement, which would require ½-in. round four-part stirrups at 6-in. centers. The maximum flexural bond stress is 217 lb.; assuming an ultimate bond resistance of 300 lb. per sq.in. for flats, the design leaves a considerable margin of safety. The bond stresses along the pier-spandrel intersection are analogous to those produced by a pull-out test, which always run somewhat higher than those of a beam test. In any case very high resistance to this type of bond stress could be obtained by welding special anchors to the bars at critical points.

Simplified Analysis—Owing to the relatively short and deep sections for both piers and spandrels the wall-bracing type of construction is better adapted to an approximate stress analysis than is the usual beam-and-column portal frame. Also, since the wall itself carries the entire lateral load and is at the same time far stiffer than any possible interior construction, the troublesome and uncertain problem of apportioning load among the varius bracing bents and the walls and partitions is removed.

EFFECT OF EARTHQUAKE BRACING ON STEEL TONNAGE AND BUILDING COST

Assumed Lateral Force	Tons of Steel	Lb. of Steel Per Cu.Ft of Bldg.	Increase Due to Lateral Force, Per Cent In Steel Tonnage	Increase Due to Lateral Force, Per Cent In Total Cost of Building
None	3,230	1.68	0	0
20-lb. wind	3,410	1.77	+ 5.6	+0.57
Earthquake, force of 0.1*g*	5,910	3.07	+83.0	+9.3

* Does not include corner uplift anchors.

Since the deflection of all the columns in a given story must be the same (neglecting direct stress in the connecting beams), the total shear is distributed among them in direct proportion to their stiffness. This stiffness is measured by the deflection of the column due to flexure and shear. The former is dependent upon the stiffness of the column itself and that of the beams and connections framing into it. For shear, the relatively short and deep piers and spandrels make the deflection relatively large.

The above tabulation of shear distribution shows the ratios of the bending deflection to shear deflection for the piers in the second story and also the percentage of error involved by assuming that the shear carried by each pier is proportional to its shear stiffness. The bending deflections shown are those due to the pier alone, since computation shows that the added deflection due to the bending of the very short spandrels and the consequent rotation of the joint is only about one-third as great, even for the case of the stiffest pier. The error involved by assuming that each pier carries lateral load in proportion to its shear deflection is small. This fact simplifies an approximate analysis, because the shear deflection varies directly with the cross-sectional area of the pier and is independent of the reinforcing as well as of the elastic properties of the rest of the frame.

Comparative Costs—Referring again to the table, the increase in total cost of the building due to employing a seismic factor of 0.1*g* in designing the steel frame was 9.3 per cent. A similar comparison for the concrete wall design indicates an increased cost of only 3.0 per cent. In this case the increase is due to the addition of 405 tons of reinforcing steel for the wall and 580 tons of structural steel in the basement and first stories. The combined cost of the forms and concrete in place for the 12-in. concrete wall was assumed to be the same as the total costof the 13-in. brick curtain wall.

Considering cost, the advantage is about three to one in favor of concrete wall bracing. It is also apparent that if the the bracing walls were extended clear to the foundation, thereby eliminating 580 tons of structural steel, the cost could probably be cut in half for this design. It seems unlikely, however, that more than a part of the walls could be extended down, such as along lot lines, and this would offer the disadvantages of a variation in stiffness of the building structure.

First Railway in Bermuda Nearing Completion

Twenty-one mile standard-gage railway fills a long-felt need for a modern transport system

By H. D. CLARKE
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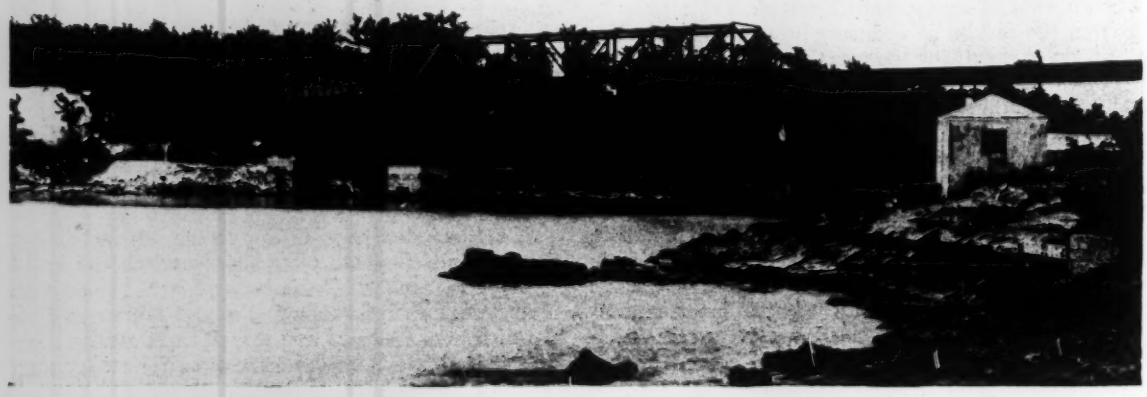
THE BERMUDAS, a group of three large and 350 small islands lying off the Atlantic coast of North America about 700 miles southeast of New York, never have had any modern form of transportation. Automobiles are strictly banned. The transportation of the islands at present consists of horse-drawn carriages and buses, bicycles and ferry boats. These are slow and often uncertain. Faster transportation has long been felt by many to be desirable, but others opposed it.

During 1924 a definite proposal to build such a railway was made by R. A. Cummings, Sr., of Pittsburgh, Pa., and in 1925 the legislature of the islands, despite considerable opposition, passed a bill authorizing its construction. Surveys were begun in August, 1928, by a group of engineers for the firm of Blum, Weldin & Co., of Pittsburgh, and actual construction was begun in 1929. Contract for the construction was let to Balfour, Beatty & Co., Ltd., of London. The islands of Bermuda occupy an area roughly 25 miles long and 1½ miles wide. The new railway has a length of 21.5 miles and is a single-track structure with passing sidings. The main depots are at the terminal docks at Hamilton and St. Georges and at an island station at Somerset. From Hamilton to Somerset (about 11 miles) the line is completed. The St. Georges end of the line between Hamilton and the eastern end of the islands will be completed Jan. 1, 1932.

Grading for the line consists chiefly in excavation in



Somerset Bridge, one of the larger structures on the new railway
An underclearance of 41 ft. above mean water is provided.

coral rock of all classifications from sand to hard crystalline limestone. The work was done almost entirely with air-operated paving breakers where the material was soft and with jack-hammer drills where it was hard.

Two and one-half miles of the total length of the railway is carried on timber and steel structures. The timber trestles are of West Coast fir, with bents set on concrete bases at 17 ft. 6 in. centers. The steel bridges, fabricated in England, are mostly deck spans 67 ft. 6 in. long. Others are truss spans 150 ft. long and there is one 135-ft. swing span.

Bridge foundations furnished several interesting problems, especially where there was considerable sand to go through before reaching satisfactory rock. At such points either two or four 6-ft.-diameter steel cylinders were sunk to rock, filled with plain concrete and finished off with a reinforced-concrete top to form the pier. These piers were tied to the rock by driving light rail piles inside the cylinders, which protruded about 5 ft. into the piers.

Concrete was of a 1:2:4 mix, and local aggregate was used. Limestone from the Harrison Sound Cave section formed the major part of the coarse aggregates. Sea sand and salt water were used in the mass concrete, and land sand and fresh water were used in mixing the reinforced concrete. (The only fresh water on the islands is rain water.) All reinforcing steel was given a minimum cover of 6 in. owing to the extreme salinity of the excessively humid atmosphere.

The track is laid with Carnegie 67.5–70-lb. rails 35 ft. long, of a section especially manufactured for Russian import during the war. The ballast is obtained locally and is a medium grade of building stone. It is quarried in lumps, loaded by a hoe scraper and broken and tamped with pneumatic tampers.

One mile of track through the city of Hamilton is laid on concrete ties. The rail is fastened to these ties with bolts, and correct gage is maintained with bridal rods.

The passenger trains are to consist of a gasoline-driven power unit, with first- and second-class accommodations and a trailer with first-class accommodations only. Freight and baggage will be handled both by gasoline-driven power units and by trailers.

Making a cut through Pond Hill
In making the cuts a drift was put in at grade and excavated material was trapped into cars to be hauled away.

Temporary staging for the Ferry Point Bridge, Bermuda Railway
One set of cylinders is down to rock, and the second is being sunk.

Constant Consistency As an Aid to Concrete Control

Experience indicates mixer operator's judgment of consistency is effective if aided by weight proportioning and separated aggregate sizes and supplemented by knowledge of weights to use under average moisture conditions together with a simple rule for adjusting weights when moisture in aggregates varies from average

By T. C. POWERS
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IN PRODUCING concrete of predetermined quality the knowledge that the solution rests largely in the control of the proportion of water to cement has greatly simplified the problem. However, it still remains for many to find the practicable means of controlling the water-cement ratio when confronted with annoying variations of the grading and moisture content of the material. Practically, the problem involves more than the control of the water-cement ratio, for, in addition to the regulation of strength, the producer must also maintain a certain degree of uniformity, consistency and workability. Even an occasional batch that is too wet, too dry or too harsh will often cause serious placing difficulties and poor results.

While operating a central mixing plant the writer found that the separation of the aggregates into enough sizes to insure control of the grading, combined with the use of weighing equipment for proportioning, afforded a simple and effective means of solving these problems. By this means variations in strength due to variations in the water-cement ratio could be kept within 8 or 10 per cent of the average without making any adjustment whatever for changes in the water content of the aggregates, *except to maintain constant consistency*.

Maintaining constant consistency, although it kept the strength variations within reasonable limits, allowed a considerable variation in the volume of the concrete per batch. To avoid complaint of short measure, this made necessary a certain margin of extra materials, which, because of the cost, was undesirable. However, a very practicable method was found for effectively reducing this variation in batch volume and at the same time further reducing strength variations. This method took advantage of the fact that any change in the amount of water required to maintain constant consistency indicated a change in the amount of water carried by the aggregate.

Simple Rule for Control

The man in charge of the mixer was furnished with a table of mixtures showing the weights to use and the amount of water to add from the tank for each mix and consistency under average moisture-content conditions. If at any time it required, in his judgment, more or less water than shown in the table, it was evident that the moisture content of the aggregate had changed. The difference between the amount of water required to produce proper consistency and the amount shown in the table provided a key to the change in the amount of water weighed into the batch with the sand and stone. Having this key, it was possible to formulate the following rule whereby the mixer operator could adjust the gross weight of the materials used so as to maintain a nearly constant quantity and quality of concrete:

Rule

If, for the given total weights shown in the table of mixtures, the proper consistency is found with a quantity of water other than that shown in the table, adjust the weights as follows:

For every gallon of water withheld, increase by 8 lb. the weight of the material in which the moisture change has taken place.

For every gallon of water added, reduce the weight of the batch 7 lb., by reducing the weight of the material in which the moisture content has changed.

To determine the correct quantities for existing conditions, the operator had but to begin by using the weights given in the table with which he was furnished and note the water requirement for the desired consistency. Then on subsequent batches appropriate adjustments were made according to the rule. This is no way interfered with production and was found to produce a surprisingly uniform product. Although tests made were not numerous, the test results for a given mixture showed a maximum "spread" of about 10 per cent over a period of three months.

The explanation that follows of the derivation and use of this rule is based on a specific experience, but the fundamental principle involved is general, and, once understood, its adaptability and limitations are apparent.

Development of the Procedure

To restate the problem:—The successful operation of a mixing plant, from the standpoint of mixture control, depends on the control of three factors: (1) quality of product and its potential strength; (2) consistency and workability; (3) uniformity in quantity of concrete per batch.

Plant Procedure—In the particular plant in which this procedure was first tried concrete was usually sold on the basis of cement content and specified consistency. However, with the purpose of maintaining uniform quality and of developing a market for concrete on a strength or water-cement ratio specification, the water ratio was controlled as closely as possible with the means at hand. Gross quantities of aggregates for each batch were carefully measured by weighing equipment. When using fixed weights, however, the net quantities were subject to fluctuations due to changes in the moisture content of aggregates, chiefly of the coarse sand.

At all times the quantity of water in the batch was controlled by an experienced operator who maintained the desired consistency as closely as possible. It might seem to some that this procedure placed entirely too much dependence upon the judgment of the mixer operator. The writer did not find this to be true, at least under the

conditions of controlled grading that prevailed at this plant. By using two sands, one a very fine material and the other a coarse paving sand, and by adjusting the relative quantities of these, it was possible to control workability and at the same time maintain the proper balance between cement quantity and the water content. The two sands were proportioned separately, the quantity of fine sand being inversely proportional to the quantity of cement used. This resulted in good workability at any cement content. The stone also was separated into two sizes, $\frac{1}{4}$ to $\frac{3}{4}$ in., and $\frac{3}{4}$ to $1\frac{1}{4}$ in.

Under these conditions variations in consistency were almost entirely due to variations in the amount of moisture carried by the sand and stone. When this variation amounted to 1 per cent or more it was absolutely essential to change the amount of added water, for, if this were not done, the consistency would change to one extreme or the other, depending of course on the direction of the moisture change. An efficient mixer operator would anticipate the changes so skillfully that fluctuations were seldom felt on the job; an operator not so skilled or experienced would observe the change in consistency as the batch was being discharged from the mixer and would make the necessary changes in the succeeding batches.

Correction for Moisture in Materials—When the plant first began operation the moisture contents of the materials were determined frequently, and compensating adjustments of gross weight were made as often as necessary, but the employment of a full-time control man proved too expensive.

From the results of tests and experience during the earlier period of accurate control, tables of mixtures were prepared showing gross weights to use and the amount of water to add when the materials carried their average quantity of water. These tables could, of course, be used with confidence only when the moisture content was approximately that shown in the tables. For example, an increase in the water content of the sand would bring about either a decided increase in wetness of the mix or else a decrease in the quantity of added mixing water. Since the latter course was necessarily followed, the result was a reduction in the volume of the batch, due largely to the fact that the increase in the amount of water weighed in with the sand replaced an equivalent weight of sand. When constant consistency was maintained an increase of 5 per cent in the water content of the sand, for example, would cause a decrease in the volume of the batch of about $\frac{2}{3}$ cu.ft. per yard of concrete, or about $2\frac{1}{2}$ per cent. At the same time the potential strength of the mixture, as indicated by the change in water-cement ratio, was increased about 6 per cent. A certain amount of workability was lost due to the reduction in the quantity of sand. Similarly, when there was a reduction in the moisture content of the sand there was an increase in the amount of added mixing water and in the size of the batch and a reduction in strength.

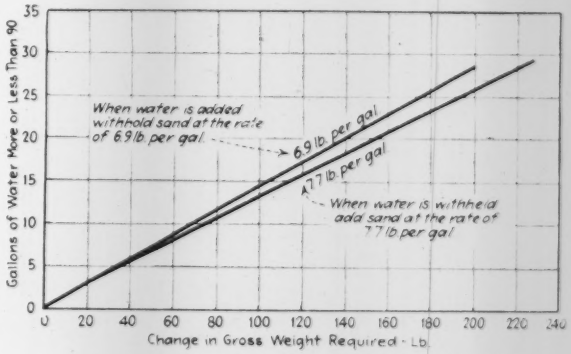
Thus, when the gross weights used were held constant, every change in moisture content was accompanied by a proportional change in the water required to produce a given consistency. It was possible, therefore, to formulate the rule given above, by which the operator could make the necessary compensating adjustments in gross quantities.

Correction Factors Determined by Trial—The method of determining the correction factors used in the rule may be used in deriving similar factors for other conditions. If compensation for water weighed into the batch as sand was all that had been required, the addition or subtraction of $8\frac{1}{3}$ lb. of sand (the weight of 1 gal. of water) for each gallon added or withheld would have been sufficient. But the key to the amount of adjustment required—that is, the amount of water added to or withheld from the quantity given in the table for that particular mix—was affected not only by the change in the amount of water weighed into the batch with the materials but also by the concomitant change in the net quantity of material. For example, an increase of water in the sand of 200 lb. per batch would not only reduce the quantity of added water by 200 lb. per batch but also by an additional amount due to the fact that there was 200 lb. less sand than before. For this reason the correction factor could not be computed but had to be determined by trial.

1	2	3	4	5		6	7	8	9
Gross Wt of sand Lb.	Moisture in sand, %	Net Wt of sand Lb.	Correct gross Wt., Lb.	Water weighed in with sand		Water added Gal.	*Total water Gal.	Diff. in water Gal.	Diff. in gross wt. reqd. Lb.
				Lb.	Gal.				
4,000	0	4,000	3,800	0	0	118	118	+28	-200
4,000	3	3,880	3,920	120	14.4	102	116	+12	-80
4,000	4	3,840	3,960	160	19.2	96	115	+6	-40
4,000	5	3,800	4,000	200	24.0	90	114	0	0
4,000	6	3,760	4,040	240	28.8	84	113	-6	+40
4,000	7	3,720	4,080	280	33.6	78	112	-12	+80
4,000	10	3,600	4,220	400	48.0	62	111	-28	+222

*Exclusive of water carried by coarse aggregate which is considered to be constant

Basis: Correct net quantity of sand = 3,800 lb.
5½ sacks of cement per cu. yard (6-in slump)



Data obtained in determining weight-correcting factors

From the mixing record the water requirements for a constant gross weight and variable moisture content were determined. The accompanying illustration gives the type of data secured. The water requirement of the batch containing 4,000 lb. of sand of 5 per cent moisture was 90 gal., which was taken as the basic quantity. Column 8 of the table shows the total water required of different moisture contents but constant gross weight. The changes in gross weight required to produce the correct net weight at different moisture contents are shown in column 9, which represents differences between column 1 and column 4.

When the water differences, more or less than 90 gal., were plotted against the required change in gross weight, as shown in the graph, the relation was not found to be exactly linear, but the errors produced by assuming a straight line were found to be unimportant. In fact, it was sufficiently accurate to use the even numbers of 7 lb. of sand to be subtracted for each gallon of water added, and 8 lb. of sand to be added for each gallon of water withheld.

Method of Using the Rule—In order to determine the correct gross weight to be used under the existing con-

ditions a batch was first run using the gross weight of aggregate given in the table of mixtures with which the operator was furnished. Sufficient water was added to the first batch to produce the desired consistency, or, in case difficulty was encountered, several batches were run until the correct amount of water for the desired consistency was determined. Noting the difference in the amount of water added and the amount given in the table, the mixer operator then applied the rule. For example: for a certain mixture the table gave 90 gal. of water to be added to the 3-yd. batch. The actual quantity of water used to obtain the desired consistency, however, was only 62 gal., due, it was observed, to wet sand. The quantity of water withheld was therefore 28 gal. Then, applying the rule, $8 \times 28 = 224$ lb. to be added to the gross weight, by increasing the weight of the sand. Or 4,000 lb. (the weight of the sand given in the table) + 224 = 4,224 lb., the gross weight of sand to be used.

When the operator was learning the rule it was necessary to add a word of caution regarding its use. In the example just cited, the 28 gal. withheld called for an addition of 224 lb. from the sand bin. After making this adjustment it was found that something more than 62 gal. of water was necessary to produce the correct consistency, in this case about 3 gal. more, raising the total to 65 gal. If not cautioned, the mixer operator was apt to make further adjustments on the basis of the last observed water requirement; that is, on the basis of the difference between 65 and 90 gal. In general, it should be remembered *that the rule applies only when using the gross weights given in the table upon which the rule is based*. However, after making the first adjustment in gross weight of sand and changing the added water to 65 gal. per batch, as in the above example, if another change in moisture content of the stand occurs, causing the water requirement to increase to, say, 70 gal. per batch, the appropriate reduction in the amount of sand could be made by applying the rule on the basis of a 5-gal. increase in water requirement ($5 \times 7 = 35$ lb.), making the deduction *from the gross weight then in use*. After one or two such adjustments it might be necessary to run a batch or two using the weight given in the table, making the necessary adjustment in order to avoid cumulative errors.

It is entirely a matter of judgment as to which of the divisions of aggregate to adjust. In this plant the major variations were usually in the coarse sand, seldom in the stone. It is conceivable that under other conditions amplifications of the rule might be necessary to provide for simultaneous variation in two or more of the divisions of the aggregate, stating how the total required change is to be divided between the different materials.

Effect of Changes in Grading—So far, there has been considered only the fluctuation due to moisture changes. Water requirements are affected by the gradation changes also. If gradation is subject to frequent and wide fluctuation, the use of the rule would probably not be satisfactory unless checked by laboratory tests. The effect of smaller variation in gradation, however, such as would be encountered under the conditions found at the plant described, is almost automatically neutralized by the use of the rule. A coarser sand, for example, requires less water, but more of the sand should be used for the sake of workability. The reduction in the water requirement due to grading will bring about a desired increase in quantity of sand when the rule is applied. A finer sand is properly reduced in quantity the same way, for by the use of the rule its greater water requirement would bring about a reduction in the quantity of sand.

Limitations—From the foregoing description of this means of adjustment for changes in moisture content it is apparent that there is a certain amount of inexactness inherent in the method. However, it should be remembered, when considering the probable errors, that they are of relatively little importance, for the whole process merely constitutes a method of securing more precise control than that which could be obtained by the control of consistency alone, which will by itself produce a quite uniform product where accurate weighing of ingredients is practiced. Thus, that which might appear to be a considerable factor of error might represent but an unimportant departure from the exact result desired. Nevertheless, because of the large human element involved, it is not recommended as more than an adjunct to precise laboratory control, where such control is economically feasible. Within the range of fluctuation ordinarily encountered, however, the use of the rule proved to be remarkably effective. The mixer operators soon learned to anticipate the variations to a large extent and to make the necessary adjustments readily by memorizing the simple rule. The product obtained was remarkable for its uniformity of quality, workability and batch volume. Supervision and laboratory work were minimized.

Although the method has been described in the terms of a specific experience, the fundamental relation between the water requirement and the amount of water carried by the aggregate is general. Application of this principle should be an aid to control wherever weighing equipment is used.

New Safety Code for Elevators

Elimination of all speed limits for passenger elevators is one of the features of the new national safety code for elevators announced by the American Standards Association. Approval of the code by the association followed nearly four years of research on elevator safety devices at the U. S. Bureau of Standards, one result of which has been the redesign of almost all elevator buffers. For the first time the operation of more than one elevator car in a single shaft is permitted, while rigid safeguards to eliminate any possibility of collision between the cars are set up. The code also provides for two-story cars to serve two floors simultaneously from the same shaft. Further provision is made for a new type of express-local system in which the master express elevator will stop only at plaza floors, ten, fifteen, or even more stops apart, at which points passengers will transfer for local elevators starting from the plaza floors.

The code insists upon fireproof elevator-shaft inclosures and fireproof housing for the elevator machinery, so that elevator evacuation of a fireswept skyscraper will be possible.

Although the efficiency of present safety devices permits safe elevator operation at any speed, it is believed that the limit of speed will not go much beyond 1,200 ft. per minute because of the discomfort to passengers resulting from rapid change in air pressures in ascent or descent. It was found that any speed above 700 ft. per minute requires automatic operation with automatic floor-leveling devices.

The code also includes provisions for the safe operation of freight and other types of elevators, passenger-operated lifts, escalators and dumb-waiters.

Deflection Tests Show Rigidity of Steel Rigid-Frame Bridges

By R. M. HODGES

Assistant Engineer, Westchester County Park Commission, Bronxville, N. Y.

LOAD-DEFLECTION tests, recently made on three structural-steel rigid-frame bridges in Westchester County, N. Y., show very small deflections in comparison with what would be expected for ordinary steel-girder bridges of equal spans. These tests are of particular interest because these three bridges were the first of their kind ever built, and there had been no previous opportunity to determine how such structures would behave under the traffic loading for which they were designed. The tests were made because it has been claimed that the construction is flimsy and that excessive vibration and deflection have been observed, tending to crack up the pavement slabs and cause racking strains in the girder frames themselves. Such a condition, if it actually existed, would of course seriously impair the durability of this type of construction and practically destroy its usefulness, in spite of all other advantages.

The bridges tested (all spanning N. Y. Central Railroad right-of-way) were as follows: The Mount Pleasant bridge, carrying the Bronx Parkway Extension over the Harlem division; the Chappaqua bridge, carrying Main Street, Chappaqua, over the Harlem division; and the Odell Ave. bridge over the Putnam division near Gray Oaks station. The Mount Pleasant bridge (*ENR.*, March 28, 1929, p. 509) was built by the Westchester County Park Commission, and is characteristic of steel rigid-frame bridge construction. The other two bridges were built by the New York Central Railroad Co.

Tests—A complete record of the tests is given in report No. 2,217 by W. J. Krefeld, engineer of tests, Columbia University testing laboratories. Only a brief description, together with a tabulation of the maximum deflections, is given here.

MAXIMUM DEFLECTIONS—INTERIOR GIRDER, STATIONARY LOADING

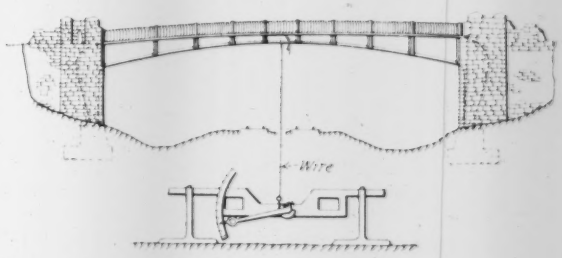
Bridge	Spacing of Frame Girders, Ft. Centers	Spacing of Cross-Frames, Ft. Centers	Span, C. to C. Bearing, Ft.	Skew, Deg.	Maximum Deflection, In.
Mount Pleasant	5 on 11.5	11.5	104	45	.077
Chappaqua	4 on 12.0	10.0	75.5	None	.075
Odell Ave.	5 on 10.0	12.0	75.0	None	.037

Loading was applied by two trucks approximating very closely in load distribution and wheel spacing, the standard H-15 loading. Deflections of exterior and interior frame girders were measured at the center of the span in each case for various predetermined positions of one and two trucks, with respect to the girder under consideration. The maximum deflections as tabulated above occurred in each case with two trucks side by side and almost touching, placed symmetrically with respect to the longitudinal center line of the girder, and with rear axles at center of span.

The deflection-measuring apparatus was very simple, consisting of a fine wire clamped to and suspended from the lower flange of the girder, with the lower end attached to a deflectometer such as is used for measuring deflections of small timber beams.

The oscillating deflection increments and decrements due to the same loading in motion (at about 7 miles per hour) were observed, and amounted to from .01 to .02 in. Making due allowance for increased speeds, the total maximum deflection in the case of the Mount Pleasant bridge, therefore, amounts to about $\frac{1}{10}$ in.

Conclusions—The maximum deflections of the Mount Pleasant and the Odell Ave. bridges are seen to vary approximately as the square of their spans. (The Chappaqua bridge can be thrown out for purposes of comparison, since it has no earth backing against the east end of the span whose deflection was measured.)



Diagrammatic sketch of deflection-test layout

Assuming the above span-deflection ratio to hold for longer spans, a span of more than 300 ft. would be possible without excessive deflections. Admitting that such an assumption is unwarranted, it may still be reasonably inferred that spans of at least 200 ft. could be constructed without serious loss in rigidity. Such spans would be entirely possible, using trussed-frame construction; but they probably will never be used, because the special advantages of the rigid frame as to clearances and architectural suitability, which fit the rigid frame for short spans, would be lacking in the longer span construction.

It is interesting to note also that the computed deflection of the Mount Pleasant bridge was 0.8 inch, amounting to about eight times the measured deflection. In the design, as well as in the deflection calculations, the frame girders were considered as taking all the loads without any help (except lateral support) from the floor slab and earth cutoff walls in which they are partially embedded. It appears, therefore, that the design of these frame bridges was extremely conservative, and that as experience accumulates on this type of construction it will be possible, by taking account in the design of the elastic properties of the concrete embedment, to increase greatly its present margin of economic superiority over other forms of short-span bridge construction for grade-crossing eliminations.

City Planning Commissions Increase

Of 786 municipalities in which planning commissions are established 95 were added in 1929 and 1930. The legislatures of seven states and the Congress of the United States enacted 40 laws relating to various phases of city planning. Surveys by the division of building and housing of the U. S. Bureau of Standards indicate that 257 cities in the list have a population of more than 25,000 each, and the rest vary down to villages of less than 500 inhabitants. The large majority of the more recently established planning commissions are located in the small and medium-sized municipalities. A tremendous spread of the planning movement, says James S. Taylor, chief of the division, is possible, since there are more than 16,000 incorporated municipalities.

Highway Underpasses Drained by Automatic Pumping Plants

Grade-crossing elimination causes difficult drainage problem—Depressed roadway too low for gravity drainage

By MILTON J. RUARK and C. E. KEEFER
Sewage Engineer and Principal Assistant, Bureau of Sewers, Baltimore, Md.

IN TWO CASES of grade-crossing elimination involving highway underpasses at Baltimore, Md., automatically operated pumping stations have been built to remove the surface drainage from the depressed highway and adjacent low-lying territory. One station, completed in the fall of 1930, has a contributing drainage area of 1.97 acres, and it cost $39,400. The other, completed in March, 1931, serves 3.32 acres and cost $49,900. In the first case no other drainage provision was possible; in the second a pumping station was cheaper than the deep gravity drain that would have been required otherwise. Pumps are driven at relatively slow speed to reduce abrasion of the impellers.

The Point Breeze Station

The Point Breeze drainage pumping station (Fig. 1) in southeast Baltimore, on the Broening Highway, was required because this highway, which leads to the proposed municipal airport, was lowered to pass under the Baltimore & Ohio and the Pennsylvania railroads. The street at its lowest point is 0.3 ft. above mean low tide. The pumping station was required, therefore, to remove all surface and rainwater from the underpass, comprising a drainage area of 1.97 acres. The storm drains and the inlets adjacent to the underpass were located and designed so that the area from which drainage had to be pumped would be as small as possible.

Due to the possibility of clogging of the storm inlets in the lower portion of the underpass, with resulting traffic interruptions, special attention was given to their design. The inlets used are of a type that has proved particularly successful in Baltimore in recent years. The stormwater enters the inlet through an opening in the curb 48 in. long and 6 in. high, and also through a heavy removable cast-iron grating placed in the gutter in front of the curb opening. This grating, which is in two parts, is 48 in. long and 22 in. wide. As there is a tendency for gratings of this type of inlet to become obstructed, two inlets were built on each side of the underpass where one would have been sufficient under normal conditions. A large manhole, provided with a vertical submerged baffle, was built on the drain leading to the suction well of the pumping station in order to hold back as much floating material as possible and thus lessen the possibility of clogging the pumps.

The Point Breeze station is provided with two horizontal centrifugal trash pumps, each of which is driven through reduction gears by a 30-hp. electric motor. One of the pumps is also connected through the motor to a 95-hp. gasoline engine. Each pump is designed to handle the runoff from a rainfall of 6 in. per hour, with the other unit ready for stand-by purposes.

Both pumps are started automatically by mercoid control switches. Each switch is connected with a pipe, which terminates in the suction well of the station. The open end of this pipe is at an elevation below the water level at which the drainage pumps stop. As the water flows into the well, the air in the pipe is compressed; and at a predetermined point this compressed air actuates the mercoid control and starts the pump. There is a third mercoid control in the station that rings an alarm in the main sewage pumping station of the city, 3½ miles away, and also in the power house of the Western Electric Co., which is only half a mile from the drainage station. An agreement has been made with this company, which is particularly concerned in keeping the Broening Highway open to traffic at all times, to send an operator to the station to start the gasoline engine and the stand-by pumping unit and remain there until a city operator arrives, or until electric power is again available.

In order to eliminate the use of check valves the discharge pipe from each pump was carried vertically upward some 3 or 4 ft. above the hydraulic grade and

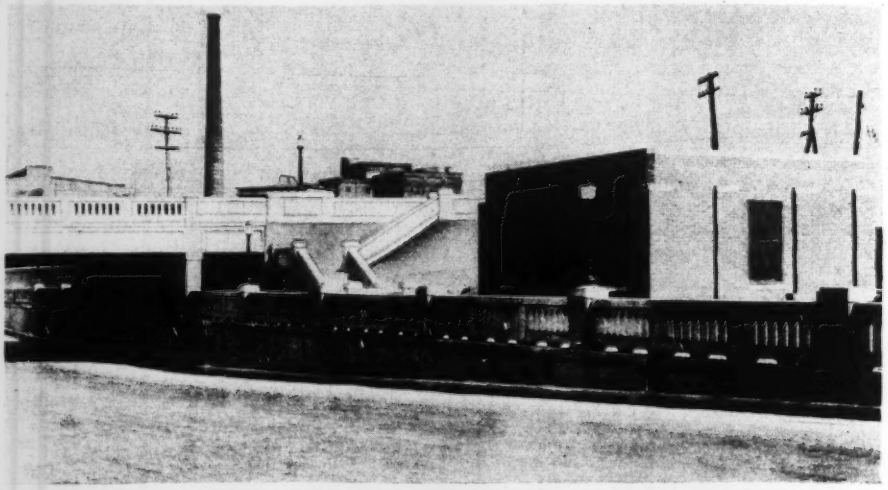


Fig. 1—Depressing Broening Highway under railroad necessitated pumped drainage

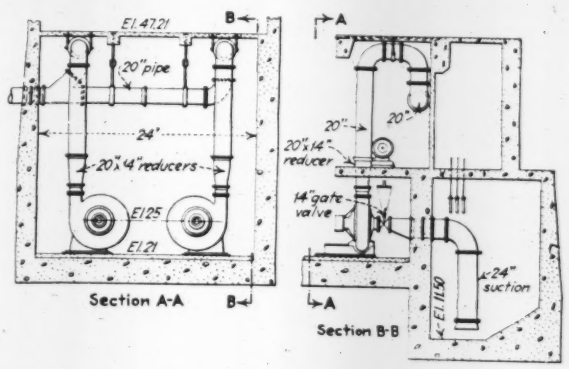


Fig. 2—Piping arranged to avoid check valves

then built so that it would discharge downward into a common discharge line. This arrangement of piping has the special advantage of making it impossible to pump drainage from one pump through the discharge pipes and back through the other pump. This condition could only occur in case a check valve was not fully closed.

The substructure of the station was built entirely of reinforced concrete, with one room for the pumping equipment and an adjacent subsurface suction chamber with a storage capacity of 30,200 gal. Although none of the concrete in the station was waterproofed, there has been no leakage of water into the pump room, even though the bottom is 14 ft. below grade and 7 ft. below low tide. A one-story brick building was constructed over the pump room. The design is such that the mechanical equipment is readily accessible for repair, and any part can be easily removed from the building.

The pumps, designed to handle liquids containing large solids, have 16-in. suction and discharge nozzles and two-vane enclosed bronze impellers, with passages sufficiently large to pass a 9½-in. sphere. Experience over a number of years with centrifugal pumps at the Baltimore sewage-works, where sewage and sewage sludge is pumped, has indicated the desirability of operating pumps at slow speeds, especially where the material pumped contains gritty substances or considerable suspended matter. The pumps are, therefore, designed to operate at a speed of 263 r.p.m. Cast-iron impellers at the Baltimore sewage-works have given unsatisfactory results due to the brittle nature of the material, which has frequently broken. Bronze impellers were used, therefore, even though more expensive.

The Highlandtown Station

To expedite traffic along Eastern Ave., one of the main arterial thoroughfares in the eastern part of the city, another underpass was constructed under the Pennsylvania and the Baltimore & Ohio railroads. While it would have been possible to construct a gravity drain from the low point in the underpass (30 ft. above mean low tide) to the harbor, this would have required the construction of a 30-in. drain for a distance of 6,500 ft. in a trench having an average depth of more than 30 ft.

COSTS AND CAPACITIES OF DRAINAGE PUMPING STATIONS

		Costs*						
		Mechanical and Electrical Equipment,	Building					
Station	Year Built	Piping, Etc.	Total Cost	Cost per Cu.Ft.	Total Cost	Capacity, G.P.M.	Total Head, Ft.	Area Drained, Acres
Point Breeze...	1930	$18,600	$20,800	$0.65	$39,400	5,600	15	1.97
Highlandtown..	1930-31	29,300	20,600	0.47	49,900	8,200	20	3.32

* Exclusive of engineering expenses.

As this plan would have been considerably more expensive than that of building the pumping station, it was not adopted.

The area drained is 3.32 acres. Two motor-driven pumping units were installed, each having a capacity of 8,200 gal. per min. against a total head of 20 ft. when operating at a speed of 285 r.p.m. Instead of providing stand-by service by means of a gasoline engine direct-connected to one of the pumping units, a 60-kw. electric generator was provided, direct-connected to a 115-hp. gasoline engine. This design gives considerable more flexibility than that provided at the Point Breeze station, as either pumping unit can be out of service and the

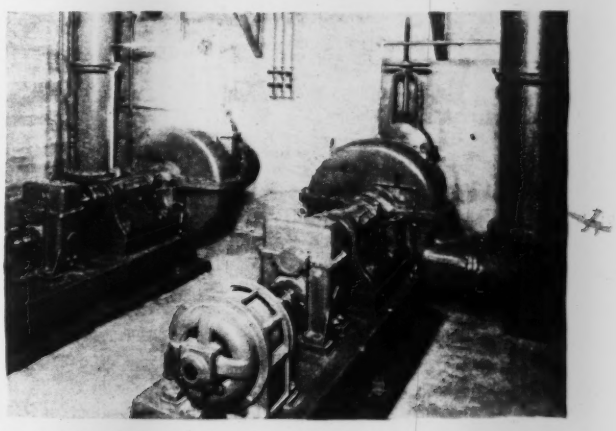


Fig. 3—The drainage pumps are driven through speed reducers

other can be run either by outside power or by the engine-driven generator in the building.

The entire station was made automatic in operation. Each of the pumping units, driven by 60-hp. slip-ring motors, is started by means of a mercoid control switch, as at the Point Breeze station. In case the incoming power fails and either of the mercoid control switches is in the closed position, contacts on an auxiliary relay close, and current from a 12-volt storage battery furnishes power to the ignition system of the gasoline engine. A second electric circuit then closes and actuates a solenoid valve in the gasoline supply pipe, and a third circuit opens a solenoid valve in the pipe line furnishing cooling water to the engine. The gasoline engine continues to run until outside electric power is again available, or until the suction well is pumped dry or cooling water is no longer available. Each time the gasoline engine starts, an alarm bell rings in the main sewage-pumping station, where an operator is always present.

Trash-type pumps installed in this station have 14-in. suction and discharge nozzles and are designed to pass 12-in. spheres.

To insure the satisfactory operation of both stations, a weekly inspection is made, and each pumping unit, together with the automatic equipment, is operated for a brief period. Emergency service from the main sewage-pumping station is always available in case any of the automatic devices fail to function. Experience will demonstrate whether it will be advisable to have an operator on hand during excessive or continued rainfalls.

The design and the construction of these two stations was a part of the general program of the department of public works, headed by B. L. Crozier, chief engineer, to eliminate railroad grade crossings. They were designed and built under the general supervision of the writers.

Welded Joint Carries Column Load of 380 Tons in Lobby Alteration Job

Third field-welded addition to Du Pont Building in Wilmington, Del., involves floor enlargements, addition of several stories and lobby alterations in which a double truss is inserted to pick up a heavy column load at the second floor through a special welded connection

THE DU PONT office building in Wilmington, Del., accommodates not only many executive offices of the E. I. du Pont de Nemours Co., but also a theatre, a hotel and various other commercial interests. During the past year or so three extensions or additions have been made to this structure, so that it now has fourteen stories throughout and, except for interior courts, covers an entire city block. In all of this work the elimination of unnecessary noise was imperative, and consequently arc welding was employed in the principal field connections, supplemented in many places by bolts for the purpose of assembly preparatory to welding and for some permanent secondary field connections. Practically all shop fabrication was by rivets. The first and major addition, the erection of a fourteen-story building involving about 1,500 tons of steel, was described in *Engineering News-Record*, Dec. 11, 1930, p. 927. The extent of the present addition, involving 320 tons of steel, is shown in Fig. 1. The work consisted in enlarging some floor areas, rearranging others and adding several stories to a portion of the building. The several modified floor areas varied from 36x44 ft. to 62x102 ft. The most interesting operation consisted in inserting, between the first and second-floor levels above the entrance lobby, a truss to assume the entire load brought down through the upper stories by a column, and then removing by flame-cutting that part of the column below the truss and above the ground floor, after the upper part of the column had been secured to the truss by welding. A similar operation, utilizing a plate girder to pick up another column load, was also performed several months previous to the truss work.

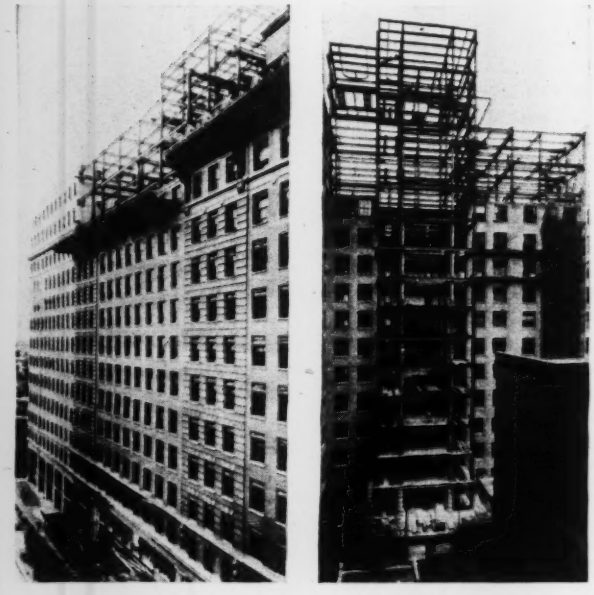


Fig. 1—Front and rear views of field-welded steelwork on new addition to Du Pont Building in Wilmington, Del.

The comparative noiselessness of welding was particularly advantageous, because much of the work was done in the interior court with occupied offices on every side. In the front view of the building the completed addition at the corner was also field-welded (*ENR*, Dec. 11, 1930, p. 927).

By FRANK P. McKIBBEN
Consulting Engineer, Black Gap, Pa.

Lobby Alterations—The job of enlarging the entrance and lobby required the removal of that part of one of the main steel columns (Col. 12) between the ground and first floors. The problem was to accomplish this without allowing any settlement or cracking in the walls, floors and partitions. The solution lay in the use of a double truss inserted in the structure so as to give the truss such an initial downward deflection by transferring to it the dead load of approximately 400,000 lb. that when the column was welded to the truss at its central top chord joint and the lower part of the column was removed, no measurable deflection in the superstructure took place. The double truss was designed to support a combined dead and live load of 760,000 lb., and most of this load passes from the column to the truss through the welded connection.

To transfer the dead load of Col. 12 to the truss (Fig. 2), it was necessary to design and construct the truss as two separate trusses, each completely shop-riveted and, before erection, independent of the other; so arranged that each truss could be set in position alongside of and in contact with the column preparatory to welding. The following is a summary of important steps in this construction.

1. Col. 423 and 424 were set in position to receive the double truss.

2. As old Col. 12 consisted of a web, four angles and four coverplates, and as the rivets connecting the covers to the angles were to be removed before the truss was placed in position, the next step was to weld each pair of two $\frac{3}{4}$-in. covers together with 72 in. of edge weld on each edge; to weld, with $\frac{1}{2}$-in. fillet welds, the coverplates to the angles and the latter to the column web. These welds are designated, respectively, as *O*, *N* and *M* in section *xx* of Fig. 2.

3. A double truss was erected with each portion on opposite sides of and close to Col. 12; the truss was at first bolted (through shop-drilled holes) and then welded to Col. 423 and 424.

4. Diaphragms (marked *C*, Fig. 2), each consisting of a web plate and four connecting angles, were inserted in the top and bottom chords of the truss and welded. Similarly, other diaphragms (marked *A*, Fig. 2) were placed between the vertical gusset plates of the trusses; and tieplates were added by welding to each diagonal near the panel points.

All of these diaphragms and tieplates, except diaphragms *A* and two tieplates near the central top chord

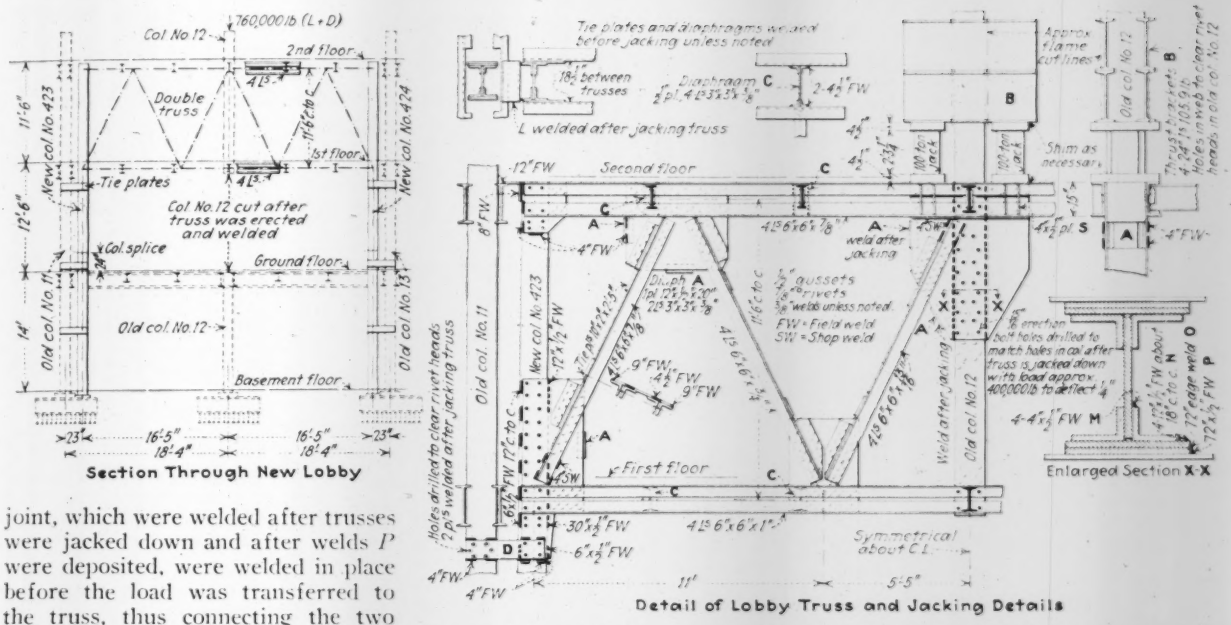

760,000 lb (L+D)
Col. No. 12
2nd floor
Double truss
1st floor
Tie plates
Col. No. 12 cut after truss was erected and welded
Col. splice
Ground floor
Old col. No. 12
Basement floor
New col. No. 423
New col. No. 424
Old col. No. 11
Old col. No. 13
Section Through New Lobby
Tie plates and diaphragms welded before jacking unless noted
Diaphragm C
L welded after jacking truss
Second floor
Shim as necessary
Gussets 5/8" rivets 7/8" welds unless noted
FW = Field weld
SW = Shop weld
First floor
Weld after jacking
Holes drilled to clear rivet heads 2 pl's welded after jacking truss
Symmetrical about C.L.
Enlarged Section X-X
Detail of Lobby Truss and Jacking Details

Fig. 2—Structural details of entrance lobby enlargement involving the transfer of a 760,000-lb. column load to a new truss through a welded connection

In the enlarged detail of one half of the double truss the jacking arrangement for transferring load of Col. 12 to the truss together with the welded joint are shown.

joint, which were welded after trusses were jacked down and after welds *P* were deposited, were welded in place before the load was transferred to the truss, thus connecting the two trusses for lateral stiffness.

5. Two thrust-bearing brackets (marked *B*, Fig. 2), each consisting of two 24-in. 105.9-lb. I's were placed on opposite sides of Col. 12, far enough above the top of the truss to admit two hydraulic jacks with proper bearing plates. To avoid interference with heads of rivets connecting the coverplates of Col. 12 to its angles, large holes were drilled in the webs of the I-beams to fit over the rivet heads. These thrust brackets were then welded to the face of the column for full depth, making 4 × 48 or 192 in. of $\frac{3}{8}$-in. fillets. Stiffener plates 4 × $\frac{1}{2}$ in. (marked *S*, Fig. 2) were welded in the top chords under the jacks; and the lower edges of the top-chord main angles were welded to the truss gusset plates, at the central top-chord joint. Some beams were erected in the first and second floors to act as braces for the truss.

6. Pressure was applied to the jacks, thus gradually deflecting the truss downward and consequently relieving the load from the lower part of Col. 12 and transferring it to the truss. When the central top-chord joint's downward deflection reached the predetermined amount of approximately $\frac{1}{4}$ in., the dead load of 400,000 lb. was then borne by the truss, the jacks were wedged, holes were drilled in the truss gussets to match existing holes in the column to allow for bolts with which to draw the truss and column in close contact for welding; and four vertical lines of $\frac{1}{2}$-in. fillet, each 72 in. long, (marked *P*, section *xx*, Fig. 2) were deposited to weld the truss gusset plates to the outer coverplate of Col. 12.

7. Col. 12 was then removed by cutting with an oxy-acetylene torch just below the truss lower chord and above the ground-floor level. The thrust-bearing brackets were removed with a torch. Various welds of minor importance were made.

Truss Deflection—Initial vertical deflection of the central top-chord joint of the truss, amounting to $\frac{1}{4}$ in., was required to be such that, with the lower part of Col. 12 removed, no perceptible settlement would occur in the existing building. This deflection is composed of two parts: first, elastic deflection within the truss itself due to the dead load of 400,000 lb.; second, settlement of the whole truss resulting from shortening of its supporting columns. The calculated elastic deflection was 0.163 ($\frac{5}{32}$ in.), and deflection due to column shortening was 0.059 ($\frac{1}{16}$ in.). Values observed by a wye level were approximately $\frac{1}{8}$ and $\frac{1}{16}$ in.

Except for the truss described above, structural details were of the usual combined shop-riveted, field-welded types. Some of these are shown in Fig. 4. Column splices, in nearly all cases, were made by two plates shop-riveted to the upper and field-welded to the lower column.

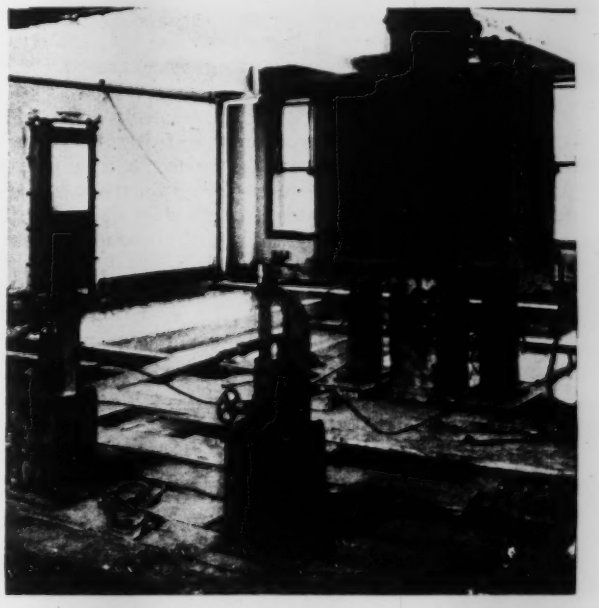


Fig. 3—Hydraulic jack set-up around Col. 12 on second floor

I-beam thrust brackets are fitted tightly against faces of columns to provide bearing for the jack reactions.

sections. These plates were connected to the flanges only, no web splices being used except in one type, where some new columns were superposed on old ones. To secure upper and lower columns during erection and before welding was applied, two or four bolts were used in each flange of the lower column section. Inasmuch as the upper column section was of less width in all cases than the lower, fillers were required to make up this difference; and as these were inserted in the shop between each column flange and its splice plate they were of course riveted, thus avoiding much welding.

Connections of beams to beams were generally of two types (Fig. 4), although altering existing steel resulted in various deviations from these principal types. For connecting new beams to new beams, two connecting angles were shop-riveted to one beam, field-bolted and later field-welded to the supporting beam. This connection has two desirable features. It can be easily erected by bolts and later welded; and being welded at the outer edges of the connecting angles, it offers a considerable amount of flexibility as an end connection. Where the beams to be supported are large, the use of bolts only (without seat angles) for erection is not as simple as if shelf angles are supplied. Especially is this true in cases where two large beams, one on either side of the supporting beam, are connected by the same bolts.

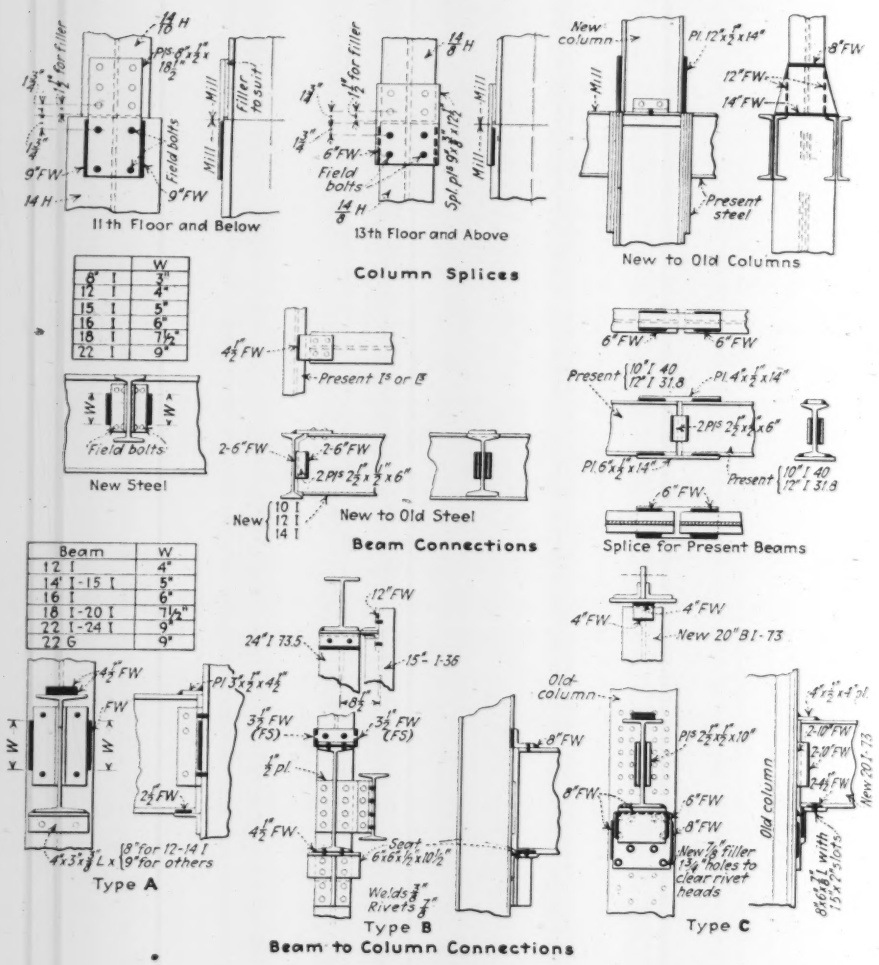


Fig. 4—Typical welded details, Du Pont Building

A second type of beam-to-beam connection consisted in the use of two narrow connecting plates instead of angles. These plates were field-welded to the web of each beam. A ¾-in. plate, shop-riveted on the top flange of one beam and field-welded on the top flange of the supporting beam or channel, afforded an easy means of erection.

Splicing an existing 12-in. 31.8-lb. I-beam was effected by using two splice plates for the web, and a cover splice plate on each flange. By using a narrow splice plate on the top flange and a wide one underneath the lower flange, only downward welding was required. For a beam of known size and capacity the design of the splice plates and determination of fillet lengths are simple. Thus, total stress in each plate $= M/h = SI/yh = S/h$ times section modulus. The area of each plate $= I/yh =$ section modulus divided by h. The length of each fillet on each side of the splice = total stress in plate divided by $2u = SI/2yhu = S/2hu$ times section modulus.

M = bending moment in in.-lb. on beam at splice.
S = unit stress in lb.-sq.in. in beam in bending, ordinarily 18,000 for quiescent loads.
I = moment of inertia in inch units.
y = one-half depth of beam in inches.
h = depth of beam in inches.
u = safe allowable unit longitudinal shearing of fillet per linear inch.

Connections of beams to columns were made generally by means of brackets, shop-riveted or field-welded to column webs or flanges. One of the details shown in Fig. 4 illustrates an interesting and useful application of welding where a new 20-in. beam, in connecting to the flange of an existing column, required a filler plate ⅞ in. thick with 1¾-in. drilled holes to fit over rivet heads. This filler was welded across its top and along its vertical edges to the column, then the beam's seat angle was welded to the filler.

WELDING DATA FOR SECTION NO. 4 OF DUPONT OFFICE BUILDING WILMINGTON, DEL.

Item		
1.	Electrode melted and wasted, lb.	1,205
2.	Current used, kw.-hr.	2,760
3.	Total tonnage of new structural steel in alteration, tons	320
4.	Fillet per ton of steel, 23853/320, in.	74.5
5.	Fillet deposited per lb. of electrode melted and wasted, 23853/1205 in.	19.8
6.	Fillet deposited per kw.-hr. 23853/2760, in.	8.6
7.	Electrode melted and wasted per kw.-hr., 1205/2760, lb.	0.44
8.	Current required per lb. of electrode melted and wasted, 2760/1205, kw.-hr.	2.29
9.	Electrode melted and wasted per ton of steel, 1205/320, lb.	3.77
10.	Electrode melted and wasted per lin in. of fillet, 1205/23853, lb.	0.051
11.	Current required per ton of steel, 2760/320, kw.-hr.	8.63
12.	Erection started	May 18, 1931
13.	Welding started	May 18, 1931
14.	Erection completed	June 8, 1931
15.	Welding completed	June 13, 1931
16.	Height, ground floor to pent house roof	193 ft. 8 in.

Pertinent Welding Data—Welding data are presented in the accompanying table, in studying which one should bear in mind the nature of this project—alteration of and extensions to an existing riveted structure, with new steel, shop-riveted and field-welded. Some intermediate beams were field-bolted only. The shape, dimensions and location of the new and old parts of the building were such that no provisions were required in the steel for wind stresses. The data in the table should be of value in estimating, for a similar structure of known steel tonnage, the following items:

1. The number of pounds of electrode required (the product of the steel tonnage and the figure 3.77 of item 9).

2. The probable current consumption (the product of steel tonnage and 8.63, this figure being the number of kilowatt-hours that is required per ton of steel, item 11).

Personnel—On this work the structural design was made by the Du Pont Co.'s engineering department; fabrication and erection were by McClintic-Marshall Corp., with field-welding sublet to Mellon, Taylor, Hendrickson, Inc. Supervision and inspection of welding were under Carson & Carson and the writer.

Cellular Corewall Used in Silvan Dam, Australia

Type of wall similar to that developed in Mexico for a rockfill dam is employed in an earthfill dam in Australia

By IAN M. SUTHERLAND

Senior Designing Engineer of Water Supply, Melbourne and Metropolitan Board of Works, Melbourne, Australia

CELLULAR COREWALLS for embankment dams are unusual. C. H. Howell, in his description of the Requena Dam in Mexico (*ENR*, Feb. 26, 1931, p. 359), refers to it as the only one of that type known to him. A cellular corewall of somewhat similar design has been incorporated in the Silvan Dam of the water-supply system of Melbourne, Australia, now nearing completion. A brief description of the latter dam was given in Prof. H. E. Babbitt's account of engineering work in Australia, published in our Jan. 15 issue. More details are given in the following account of that dam. —EDITOR.

PRELIMINARY STUDIES and estimates for Silvan Dam were made by the writer in 1917 under the direction of E. G. Ritchie, engineer of water supply, Melbourne and Metropolitan Board of Works. Construction by day labor was begun in November, 1927, and the dam will be completed late this summer.

The crest of the finished dam will be 140 ft. above the lowest part of the embankment; the length of the dam will be 2,100 ft., and the capacity of the reservoir will be 8,850 million gallons.

The foundation is on stratified shaly mudstones. The main body of the dam is entirely built of carefully compacted earthfill, with a 3 to 1 upstream slope, a 2 to 1 downstream slope and 5-ft. berms at 20-ft. vertical intervals. The upstream slope is beached with spalls over smaller stone, the downstream slope is covered with soil, and there is a small rockfill toe at the foot of the downstream slope. A cross-section is shown in Fig. 1.

A cross-section of the corewall is given in Fig. 2. It is of concrete reinforced continuously at both faces with $\frac{1}{2}$-in. diameter mild steel rods at 12-in. centers both ways. There are no contraction joints as a system of continuous construction was adopted in preference to that of breaking continuity by the introduction of contraction joints. The thickness of the core wall on the upstream side of the shafts is 1 ft. at the top, with a batter of 1 in 60 at each face. Therefore, the thickness (in feet) of the concrete to resist leakage at any depth d (in feet) is

$$1.00 + \frac{d}{30}$$

Shafts 3 ft. in diameter are constructed in the corewall at 4 ft. 6 in. centers. These shafts are closed at the top with movable reinforced-concrete covers 40 in. in diameter and 4 in. thick. The bottom ends of the shafts are connected to a drainage gallery. As the sides of the gallery are subjected to a large horizontal load, to avoid weakness the diameter of the shafts was reduced from 3 ft. to 6 in. for a height of 5 ft. 5 in. above the top of the gallery.

The gallery is shown in the cross-section in Fig. 2. It is 5 ft. $6\frac{3}{4}$ in. high and 2 ft. 9 in. wide, is provided with a drain and hand-rail, and it is arranged to make access and inspection easy. The steepest grade in the gallery is 1 in 10. Where a sharper rise is required, this is provided in flights of six or twelve steps, the multiple of six steps having been adopted to standardize formwork. For purposes of design the sides of the gallery were considered as arches; the reactions to the abutment thrusts are supplied by the weight of concrete above

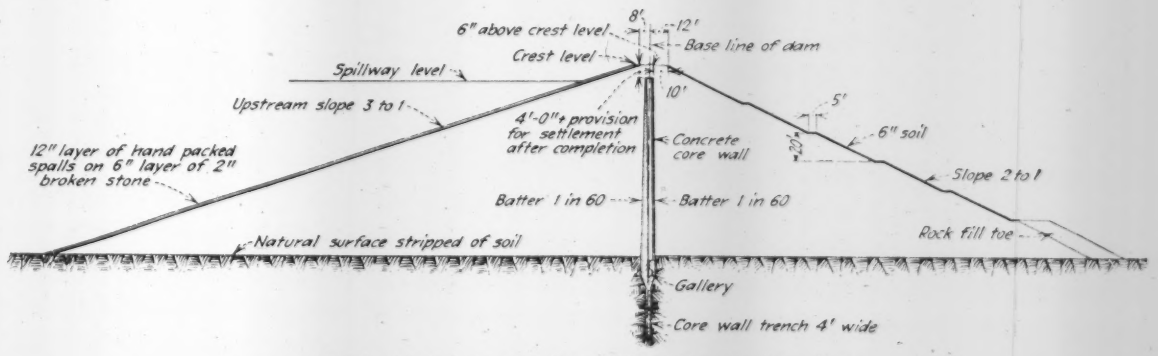


Fig. 1—Typical cross-section of Silvan Dam in Australia

the gallery and by vertical reinforcement across the gallery.

The gallery is drained at its lowest point into a concrete conduit 14 ft. in diameter, from which drainage can be discharged at the downstream toe of the dam. This conduit gives access to the gallery for inspection and is also used to accommodate the two 54-in. pipes for drawing water out of the reservoir.

Arched walls for the sides of the shafts, as shown on p. 359 of *Engineering News-Record* of Feb. 26, 1931

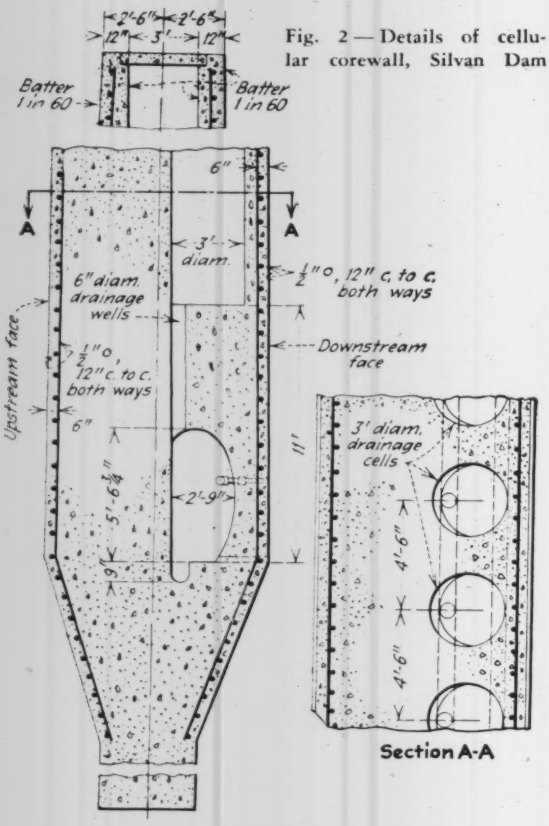


Fig. 2 — Details of cellular corewall, Silvan Dam

(Conchos irrigation project, Mexico), were considered but were not adopted, as it seemed desirable to make the wall definitely stronger between the shafts than at the shafts, so that any cracks due to movement of the wall or filling will pass through the shafts, and any leakage that may find its way through the cracks will be drained away through the shafts instead of soaking into the downstream part of the embankment.

During construction special care was taken to leave no vertical construction joints between the shafts; all vertical construction joints pass through the shafts, and any vertical construction joint that may open later on will be drained into a shaft.

Railroad May Connect Trieste and Austria

A project to connect Trieste (Italy) and Austria is now under discussion. Three routes are being considered: through the Stelvio, Aurin Alp and Predil. The latter would probably be the most practicable to construct from the point of view of expense, military usefulness and commercial expediency. The estimated cost of construction of the new line is about $45,950,000.

Data on English Incinerator

THE NEW municipal refuse incinerator at Huddersfield, England, (*ENR*, July 30, 1931, p. 165) burned 26,916 long tons of mixed refuse during the year ending Dec. 31, 1930, at a cost of £8,311 for operation and repair, or 6s. 2.1d. per long ton. In American units this was 30,146 tons (2,000 lb.) handled at a cost of about $40,470, or $1.30 per short ton. Contrary to a practice that is becoming increasingly common in England, the refuse was put through the incinerator unscreened. The residue, which was 33 per cent by weight of the material fed to the incinerator, was screened, yielding 6,309 short tons of clinker and 3,662 short tons of dust ("dry basis"). For the year 459 short tons of "metal" were magnetically removed from the refuse before it went to the incinerator. The heat of incineration produced 116,475,000 lb. of steam, actual measurement, or 1.913 lb. per pound of refuse, equivalent to 2.508 lb. at 212 deg. F. Further details are given in the accompanying table, supplied to *The Surveyor* (London) for July 24, 1931, by H. Neaverson, superintendent of the Huddersfield transport and cleansing department. (American equivalents are added.)

The steam output exceeded the results on the official test, which in turn exceeded the contract guarantee.

The Surveyor does not state what use was made of the steam, the clinker, the dust or the metal. Instead, after giving the unit operating cost as 6s. 2.1d. per long ton of refuse burned, it says:

These costs in themselves are not high, but when the products derived are valued at a reasonable price for sale the economies of this system of disposal are forcibly illustrated. Thus, if we assume a figure of 1s. 2d. per 1,000 lb. of steam sold to an electrical generating station or other suitable user, a figure of 5s. per ton for the clinker sold (including delivery) and a figure of 20s. per ton for the metals sold (also delivered), we find that on the production figures given above we get a total revenue from sales of £8,625, or 6s. 4.9d. This leaves a small credit balance on working of 2.8d. per ton. Interest on capital and amortization have not been taken into account.

The first cost of the plant was $300,000 (*ENR*, July 30, 1931, p. 165). Considering the heavy depreciation on an incinerator with the extensive auxiliaries mentioned in the article just cited, 10 per cent seems to be a low figure for annual capital charges, or $30,000 a year, for about 30,146 short tons of refuse, or about $1 a ton.

OPERATING RESULTS

Total refuse burned, long tons (60,291,840 lb., or 30,146 short tons)	26,916
Total steam produced, Bailey meter, lb.	116,475,000
Total steam from and at 212 deg. F., lb.	150,078,000
Average steam produced per hour, lb.	17,913
Average steam per lb. of refuse burned (actual), lb.	1.913
Average steam per lb. from and at 212 deg. F., lb.	2.508
Average throughout per cell-hour, cwt.	15 (1,680 lb.)
Total boiler-steaming hours	18,416
Average superheat temperature, deg. F.	552
Average feedwater temperature, deg. F.	83.3
Total clinker produced, long tons (12,617,920 lb., or 6,309 short tons)	5,633
Total dust produced (dry basis), long tons (7,324,800 lb., or 3,662 short tons)	3,270
Percentage of clinker and dust to refuse burned	33.2
Total metal separated, long tons (918,400 lb., or 459 short tons)	410
Total current consumed (a.c.), units	998,934
Total current consumed (d.c.), units	42,187
Total current consumed (d.c. and a.c.), units	1,041,121

COSTS OF OPERATION

	£	s	d	$
Treatment of boiler feedwater at £15 per month	180	0	0	877
Transport costs for metal	35	3	0	172
Transport costs for clinker	238	12	10	1,162
Transport costs for dust	241	5	4	1,175
Current, 1,041,121 units at 0.46d. (about 0.9c.) per unit	1,996	8	0	9,722
Labor, operative	5,127	14	5	24,968
Labor, repairs	491	12	10	2,394
Total costs	£8,310	16s	5d	$40,470

LETTERS TO THE EDITOR

Filter Sand and Effective Size

Sir—I trust that you will excuse my somewhat belated contribution to the discussion of filter sand and effective size presented in your issue of May 7, 1931, p. 770, which only came to hand on June 23. Although this letter is dispatched by the first outward mail, I am afraid that you will not receive it until fully three months have elapsed from the date of publication of the comments of eleven professional brethren in the U. S. Such is the delay experienced in communicating with the rest of the world, by residents of the western margin of this island continent, who are a week's journey from Sydney and an even greater distance from the publishing office of your estimable paper, which, with the exception of a four years' break—from August, 1914, when I was otherwise engaged as a British officer—I have regularly read with interest and profit.

I am particularly interested in the subject under discussion, because for several years before the war, when resident in England, I was actively engaged in the prosecution of researches into the physical properties of filter sands and problems of interstitial flow, some of the results of which investigations are published in two papers, "Statistical and Experimental Data on Filtration" and "The Flow of Underground Water" (*Min. Proc. Inst. C. E.*, Vols. CLXXXI, 1910, p. 15, and CLXV, 1906, p. 309). The former paper is referred to several times in the course of this letter.

In the primary stage of wetting a mass of dry sand or of charging the pores of a desiccated rock mass, each individual grain, on coming in contact with some water, causes it to spread over its surface in an extremely tenuous film, which thickens if enough water is available. This action continues until a portion becomes so ponderable as to separate from the film, under the action of gravity or the attraction of the surrounding particles. When the sand bed or rock mass is fully charged with water, flow takes place through the irregular interstitial tubes, the cross-section of which is mainly dependent on the size and uniformity of the particles, although it may be modified from point to point by the packing and heterogeneity of the particles. The rate of flow is dependent on the available pressure, the length of the soil tube, the amount and nature of the material dissolved in the water (since this affects the surface tension of the water) and the amount of air that is carried into the pores by the water and liberated there.

Although the sizes of the sand grains determine the dimensions of the interstitial tubes to a considerable extent and therefore have a controlling influence on the rate of flow, this rate may be greatly modified by the resistance that a filament of water encounters in its passage through the tube; this resistance will vary with the angularity and roughness of the material, for with extremely angular rough-surfaced material of fluviatile origin there would be more abrupt changes of section and a smaller rate of flow than in an interstitial tube formed by rounded polished spherical grains of aeolian origin; a careful investigation of well-graded sands under a microscope will afford abundant evidence that even sands of the same origin and fineness may differ very markedly in roughness or irregularity of surface, because the rounding or polishing action has not proceeded so far in one case as in the other.

As one could not evolve a readily workable formula dependent on fineness and physical condition as revealed by the microscope, and as interstitial flow is dependent among other things on the behavior of the film of water enveloping the grains, it seemed that a workable formula might be evolved by considering the amount of adherent water that a mass of sand retained after it had parted with its drainage water, the weight of this adherent water being expressed in terms of an ideal film enveloping each grain.

This ideal film of uniform thickness may be more of a conception than an actuality, since its thickness undoubtedly varies considerably, being reduced or increased at points of contact of the sand grain with contiguous sand grains; but it is an appropriate conception, since excepting the straining action at or near the surface of a filter bed, filtration is largely dependent on the chemical or physical instability of matter in solution or in suspension, in films of water spread out over surfaces or flowing in tenuous filaments through interstitial tubes of constantly varying cross-section. Many tests, proved workable (Fig. 2, p. 34 of the paper on filtration) show fairly close agreement between the thickness-of-film curve for a number of graded sands and sands from filter beds of various British waterworks installations and the rate-of-discharge curve for the same sands, except for the coarsest, where the conditions of interstitial flow were hardly tenable.

Although the thickness of the ideal film varied in general with the diameter of the sand grains, it does not vary directly with the porosity, for in the case of sands collected from 23 different British installations the extreme porosity ranged from 37.2 to 60.3 per cent of the total volume of the sand, or from 1 to 1.62 in the case of Cardiff, South Wales and St. Andrews, Scotland; while the extreme thickness of the ideal film ranged from 1 to 5.97 (0.00159 in. to 0.00949 in.) for Exmouth, South Devon and Barnstaple, North Devon. In other cases the porosities differed by very small amounts (0.7 to 0.4 per cent), while the thickness of the film was about 2.3 times greater.

The formula as finally evolved is given on p. 39, and its working is illustrated in Table VI, p. 59. Subsequent work on the same lines has not given me any occasion to vary or alter it. Incidentally, in the discussion following the reading of the paper, my friend, R. E. Horton, of Voorheesville, N. Y., endorsed its application and suggested a rearrangement of the formula, as shown in pp. 127 to 130.

In view of the experience derived from the above described investigation and from similar subsequent work that has not yet been published, I am of the opinion that the qualities of any required sand may be specified by approximations, within certain limits, of: (1) the aggregate surface of the grains per unit volume; (2) the percentage porosity; and (3) the retentiveness of the surface of the grains by the thickness of the ideal film. The possession or lack of these qualities could be experimentally determined from the samples supplied by following the procedure laid down in my paper, which, although the operations may be somewhat tedious, leaves little to chance.

WILLIAM RALPH BALDWIN-WISEMAN.

Perth, Australia,
June 27, 1931.

Unnecessary Property Damage in Roadbuilding

Sir—The writer has recently come in close contact with a piece of highway engineering, and his observations lead him to believe that survey parties, specification writers and inspectors may, in some cases, be guilty of errors of commission and omission that are not worthy of the highest ideals of the profession.

This piece of road extends through some of the finest white pine in the east and is in the neighborhood not only of valuable summer dwelling property but also runs past an old homestead property that is rich in sentiment and tradition. It so happened that the road was planned to intersect four of the finest pines on the place. One of these pines was a handsome Norway standing straight for perhaps 150 ft. in height—such a tree as would be hard to find east of the Rockies. The owner had a special conference with the locating engineer, who appreciated the situation and make a slight shift in the line so as to save these four trees.

On the instep of one of these trees the surveyors cut a deep benchmark. The steam shovel moving past another one, with its bucket high in the air, cleaned off 2 or 3 sq.ft. of bark. In the case of the noble Norway pine a tractor driver, desiring to back up against an immovable object in order to clear his blades, backed up against the face of this tree and rotated his blades, with the result that he practically girdled the tree and cut far into the wood. Thus, so far, three out of four of these trees, whose life was specially interceded for and theoretically granted, are doomed. Engineers should know that when the bark is removed from a

tree and the sap wood partly cut into, fungi enter these places and ultimately destroy the tree.

In addition to the damage above described, the road runs for 1,000 ft. through a deep rock cut, which the contractor made with extremely heavy charges and with absolutely no mat protection. The result is that the trees on each side of this rock cut have the appearance of having undergone shell fire, and several hundred of them for many feet back of the cut have been broken and scored and will be lost.

In addition to this, the family cemetery has been desecrated by a tractor road running through it and by the establishment of a forge in its immediate vicinity.

The protests made to the contractor in regard to these damages were passed off with the remark that the county would pay for all damages.

The particular sin of commission to which I wish to call attention is that of the cutting of benchmarks by engineers in fine trees. As this work is very harmful and very destructive, it is about time that the engineers discovered some other way of establishing their benchmarks.

The sins of omission are in permitting contractors to damage irreplaceable property outside of the right-of-way, on the assumption that the county will pay for such damages, when of course no money will pay for that sort of thing. In my opinion this is not the fault of the contractor but the fault of loose specifications and inspection. It should be a simple matter to draw specifications in such a way that the contractor is required to confine his operations to the right-of-way, that especially fine trees should be protected by planks and that heavy blasting liable to damage trees should be protected by mats. It should be the duty of the inspectors to see that these provisions are carried out.

The engineers should follow the practice of architects and landscape architects in writing specifications for these matters. It is doubtful if the contractors' bids on a job with proper protective specifications would be increased very much, whereas the damages that the county has to settle are undoubtedly increased by careless engineering of this sort. In this day, when we are awake to the value of conservation, public highway engineers should not lag so far in the rear.

ELWYN E. SEELYE,
Consulting Engineer.

New York, N. Y.,
Aug. 10, 1931.

Cracks in Concrete Pavement

Sir—Commenting on Clifford Older's article entitled "Crack Occurrence and Control in Concrete Pavement" (*ENR*, July 9, 1931, p. 50), I believe that attention should be specifically directed to the fact that Mr. Older's conclusions regarding transverse cracks are founded upon the assumption that these cracks become more or less rapidly filled with incompressible silt or soil. If this assumption is fulfilled, the consequences predicted by Mr. Older appear to be finally unavoidable, although his term "more or less rapidly" is so vague and indefinite that he may intend his recommended precautions for developments half a century hence.

So far as observations based upon the pavements in this state (Washington) are concerned, the filling of cracks and joints with incompressible silt and soil appears to proceed at an extremely slow rate. Pavements fifteen years old or more and subjected to wide variations of temperature and moisture appear to have cracked transversely between the expansion joints in enough places to establish an internal stress condition to which they are adapted; after this they have practically ceased to crack. Where such cracks have been maintained by pouring them with a bituminous filler (which probably penetrates to only a very slight depth) they appear to have no more serious effect than that of their unsightliness; where they have not been maintained their edges may chip and round off to some slight discomfort of traffic, but otherwise nothing seems to occur. The cracks may be filling up with incompressible material, but on the other hand they may not.

It is to be observed that small particles of material lodged along the top or bottom of a crack or joint between two adjacent sections of concrete pavement that are closing together from thermal or moisture expansion are in a position as precarious as that of a concrete cylinder below the descending head of a testing machine. They are in a position where stress becomes highly concentrated, and they may become so reduced in size that wind or water will carry them away.

Employing his maximum coefficient of friction, 2, and assuming a continuous uncracked slab 150 ft. long, Mr. Older shows the direct tensile-unit stress at the mid-length section due to friction to be 150 lb. per sq.in., which he points out is 46 per cent of his assumed permissible maximum, and which he further points out would be 46 per cent too much if it is assumed that wheel loads alone produce the full permissible maximum unit stress. Grave as this situation is, it would be doubly grave had Mr. Older assumed a slab length of 300 ft. and cracks appeared to be inevitable. However, an unbroken slab length of 15 or 20 ft. would reduce this friction to 15 or 20 lb. per sq.in. and would appear to constitute not only a constructive assumption but a meritorious feature of design.

Mr. Older has elsewhere expressed his misgivings regarding the dummy joint, which has given such a successful performance in Seattle in the past decade for both transverse and longitudinal joints. (*ENR*, April 22, 1926, p. 646, and Oct. 17, 1929, p. 607.) But despite this, the dummy joint appears to be blessed with the pragmatic sanction of nature in that it works, and with the engineering sanction that comes from the accomplishment of a desired end in a simple and economical manner. It is true that the above-mentioned pragmatic sanction is based on crack observation that Mr. Older discounts, because such data "are so rarely correlated with a knowledge of actual traffic loads." Yet when in the same paragraph Mr. Older recommends the use of a mathematical formula for determining pavement thickness, which contains the term w (w = wheel load), there appear to be grounds for a certain satisfaction in the almost complete absence of visible cracks in our dummy joint pavements.

In conclusion, it might be well to add a word regarding the use of this dummy joint as a center longitudinal joint in streets or highways. Its efficacy obviously depends upon the companion slabs' remaining in fairly intimate contact in a manner no different from that of the V-shaped joints tested by Mr. Slack and reported in his article, following Mr. Older's. Therefore, connecting tiebars to maintain the slab contact are as necessary in one case as in the other. Another simple and inexpensive method of strengthening the interior edges formed by longitudinal joints is that of the California highway department: it thickens them in precisely the same manner that the outside pavement edge is thickened.

H. F. FAULKNER,
Junior Engineer, City Engineer's Department.

Seattle, Wash.
Aug. 8, 1931.

Operating Cost of Automobiles

Sir—Adding to the current discussion of the proper amount to assign to distance saving in highway studies, the following records of the cost of operating my car may be of value. I have kept the operating cost figures accurately. The car has been used on unpaved mountainous and desert roads in Arizona and also on the paved highways of California, so the results are representative of travel in the southwestern part of the U. S. The car is a four-cylinder 1923 Dodge touring model, and the costs were kept from Dec. 1, 1924, to May 1, 1930.

Total mileage	36,600	Miles average per gallon gas	16.27
Total gallons gas used	2,250		
Total quarts oil used	326	Miles average per quart oil	112
Total operating cost	$1,300		
Total depreciation	575	Miles averaged per month	563
Total operating time, months	65	Operating cost per month	$20

Total operating cost per mile, cents	3.55
Total depreciation cost per mile, cents	1.57
Total (operation plus deprec. per mile, cents)	5.12

The operating cost includes gas, oil, repairs, tires, licenses, insurance, storage, batteries, etc.

H. L. COOPER.

San Luis Obispo, Calif.

NEWS OF THE WEEK

San Diego Sewer Design Contract Assigned to Licensed Engineer

The contract to prepare plans for a new sewerage system in San Diego, held by Frank W. Seifert, who is not a registered civil engineer, has been assigned to C.G. Frisbie, an employee, who is a registered civil engineer in California. The assignment is made effective as of the date of the original contract, Jan. 2, 1931. Thus the city, in a resolution accepting the assignment, has cleared itself of the agreement for engineering service with a person not legally qualified.

This probably will mark the end of a controversy which began when San Diego called for bids for furnishing engineering service. The action was protested vigorously by the American Society of Civil Engineers. As a result the bid of Seifert was the only one received and contract was awarded to him. Subsequent activity by the board of registration for civil engineers has been instrumental in bringing about the assignment to the registered engineer.

J. W. Charleville Chosen City Manager of Pasadena

John W. Charleville, city manager of Glendale, Calif., has been elected city manager of Pasadena, Calif., to succeed R. V. Orbison, resigned. Mr. Charleville has been city manager at Glendale for the past five years. His new appointment, made by the Pasadena city board of directors, will become effective Sept. 23, but he took over his new office Sept. 1 as acting city manager. His salary will be $8,400 a year. Mr. Charleville was elected by the board after Cyrus W. Koiner, former Pasadena city manager, had withdrawn his name as a candidate, breaking a deadlock among the board members. Mr. Koiner was superintendent of the Pasadena municipal light and power department for several years before his appointment as city manager. He now is a district manager for the Southern California Edison Co., Ltd., at Redondo Beach, Calif.

George K. Hooper, city engineer-street superintendent, was removed from office Aug. 25 by Mr. Orbison, who appointed Harvey W. Hincks, Pasadena civil engineer, to succeed him. The retiring city manager also ordered the immediate removal from office of Clifford Johnson, deputy city controller.

It has been indicated that the dismissal of the two city employees would be discussed officially by the city board of directors and that at least one director would contest the dismissals.

Village Manager Ousted

Arthur Richards, who last April was selected as the first village manager of Mamaroneck, N. Y., has been ousted by the village board of trustees because, it is alleged, he devoted his time to engineering projects to the neglect of other affairs of the village. His forced resignation will take effect Oct. 15.

Army Board to Study Bridge Clearances in Illinois

A board of engineers has been appointed by Major Gen. Lytle Brown, Chief of Engineers, to examine each bridge over the Illinois River and the Illinois waterway below Lockport with a view to recommending such changes as may be found necessary to render navigation through and under the bridges reasonably free and unobstructed. The board also will prescribe a reasonable time to make changes. It consists of Lieut. Col. Max Tyler, Washing, D. C.; Lieut. Col. Richard C. Moore, St. Louis, and Lieut. Col. Roger G. Powell, Cincinnati.

Contracts Let for Buildings of Phoenix's Sewage-Disposal Plant

The Surety Building Corp., of Phoenix, Ariz., was the successful bidder in the contracts awarded Aug. 20 in connection with the water and sewer reconstruction program of the city of Phoenix. These contracts call for the erection of four buildings at the new sewage-disposal plant, the total cost to be $500,000.

Prevailing Wage Set for One Locality in California

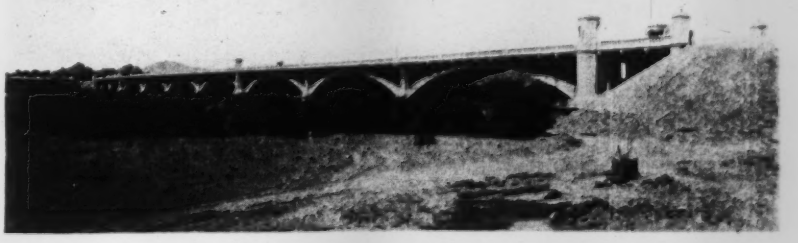
The first scale of pay for workers on state projects, as required under the newly enacted prevailing-wage law, has been announced by the California department of public works. This scale is fixed for building construction men to be employed on a new hospital building to be erected in Sonoma County. The wages provided for various crafts, according to this scale, are: bricklayers, $10; carpenters, $9; carpenters' helpers, $5; structural iron workers, $11; building laborers, $5; concrete laborers, $5.50; hoisting engineers, $9. The rate of pay approximately parallels the existing union wage scale of San Francisco.

A separate scale is to be prepared for each locality where a state project is to be constructed. The first highway wage scale will be announced soon.

Board to Investigate Water Resources of Maryland

Three engineers have been appointed members of a seven-man commission named by Gov. Albert C. Ritchie, of Maryland, to study the water resources of the state and report to the general assembly in 1933. The body will be known as the Water Resources Commission of Maryland and was created by the general assembly because of last year's drought.

The engineer members of the commission are Abel Wolman, chief engineer, state health department; Frank H. Dryden, city engineer, Salisbury; Robert E. Morse, chief engineer, Washington Suburban Sanitary Commission.



NEW HIGHWAY BRIDGE OPENED IN ARIZONA

This new highway bridge over the Salt River at Tempe, Ariz., was opened to traffic July 23. The bridge will carry the traffic of four main highways which converge to enter Phoenix. It is 1,577 ft. long, including approaches, and consists of ten spans of the arch type, each span being 140 ft. in length. It was constructed at a cost of $500,000. The bridge was built by the state highway department and the U. S. Bureau of Public Roads. R. A. Hoffman, bridge engineer for the Arizona highway department, designed the bridge, and R. V. Leeson, of Los Angeles, was consulting engineer. The Lynch-Cannon Engineering Co., Los Angeles, Calif., was the contractor. The engineers were Thomas S. O'Connell, state engineer, and R. C. Perkins, supervising engineer.

Mid-West Firms Low on Madden Dam

The combined bid of the W. E. Callahan Construction Co., St. Louis, and Peterson, Shirley & Gunther, Omaha, was apparently the low figure submitted for the construction of the Madden Dam to be built by the U. S. government in Panama. Their bid is $4,047,407. The Arundel Corp., Baltimore, bid $4,587,550. Winston Bros. Co., Minneapolis, combined with Bent Bros., Inc., Los Angeles, was third low with a bid of $4,651,683.

Rapid-Transit System Planned for Detroit

Details of a plan for a rapid-transit system for the city of Detroit, estimated to cost $200,000,000, are to be submitted to the city council in the near future in an effort to place the request for a franchise before the voters at the Nov. 3 election. The plans provide for the construction of 53 miles of subways and elevated lines.

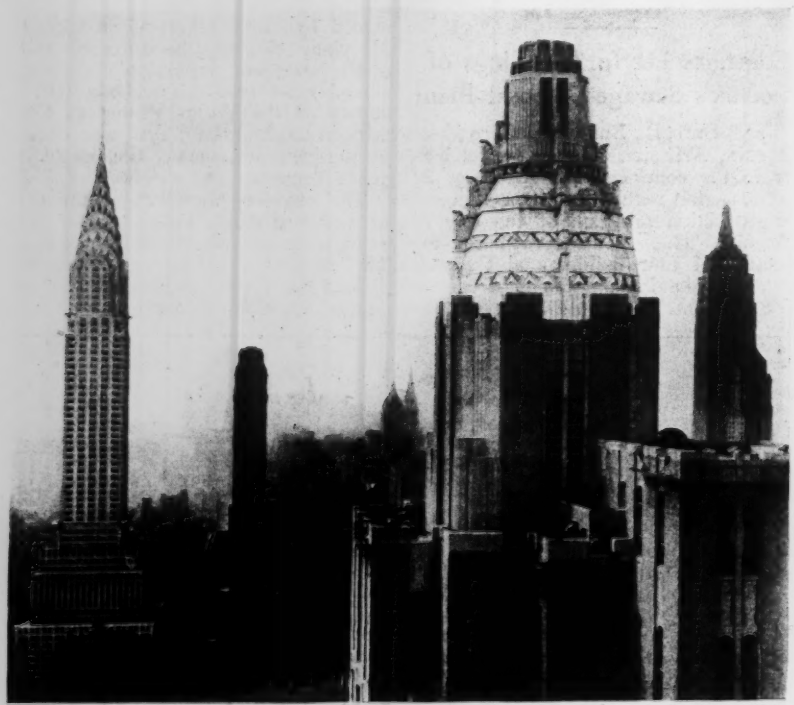
Subways are proposed for nearly every important trunk thoroughfare in the city and if the plan is approved work could start on two lines—Woodward Ave. and Grand River—next winter. The estimated cost of these two lines is $100,000,000. The project would provide employment for 15,000 men on construction next winter, it is pointed out, and another 15,000 men would be employed in providing material.

Details are being arranged by the Rapid Transit Commission, of which Sidney D. Waldon is president and John P. Hallihan chief engineer.

1,000-Mile Gas Pipe Line, From Texas to Chicago, Opened

On Sept. 1 the natural gas pipe line, nearly 1,000 miles long, from the Texas Panhandle to Chicago, was completed and opened. This line of 24-in. welded pipe was built by the Cities Service groups, the Standard Oil Company of New Jersey interests, the Texas Corporation, the Phillips Petroleum Co., the Skelly Oil Corp., the Columbian Carbon Co. and others, and will supply natural gas to the Insull mains in Chicago as well as to those of other communities on its route. As the gas is too rich for domestic use, it will be mixed with manufactured gas.

Starting from Moore County, Tex., the line runs north through the Oklahoma Panhandle to a point near Meade, Kan., then northeasterly to Platsmouth, Neb., where it crosses the Missouri River. Thence it runs through Iowa, to cross the Mississippi near Muscatine, Iowa, and counties through Illinois to Chicago.



Halbran Photo

MODERN METALS TOP OUT NEW YORK'S SKYSCRAPERS

Among New York's recently completed tall buildings, the Chrysler (at left), the Waldorf-Astoria Hotel (in foreground) and the Empire State (at right) are notable for the sheathing used for topping out their towers. The spire of the Chrysler Building utilizes chrome-nickel steel sheets (18-8 metal), while the Empire State observation tower is trimmed in this metal but inclosed by aluminum casting and glass. The twin towers of the Waldorf-Astoria, only one of which is shown in this view, are sheathed in copper covered with aluminum leaf.

State Highway Officials to Meet and Discuss Problems

The part highway construction has played in providing employment during the depression will be discussed by Henry H. Blood, president of the American Association of State Highway Officials, in his address to be delivered at the annual meeting of the assocation Sept. 28 to Oct. 1 at Salt Lake City.

There will be seven other general addresses as follows: "Fifty Years of Progress in Bridge Engineering," by D. B. Steinman, New York City; "The Addition of Roads to the State Highway System," by Samuel Eckles, chief engineer, Pennsylvania highway commission; "North Carolina's Adventure Into the Field of County Roads," by Charles H. Ross, attorney, North Carolina highway department; "Relation of Highway Building and Utilization," by Thomas H. MacDonald, chief of U. S. Bureau of Public Roads; "The Practical as Well as the Esthetic Side of Roadside Beautification," by Luther M. Keith, tree warden, Connecticut highway department; "Marking Our Highway System," by E. W. James, chief, division of highway transport, Bureau of Public Roads; "Highway Maintenance by Contract," by W. E. Ryberg, contractor, Salt Lake City.

In a group meeting to be devoted to administrative problems, which will be presided over by C. M. Babcock, of Minnesota, the following set topics will be discussed: If a Minimum Wage for Labor on the Highway Should Be a State Law, How Should It Operate? Practice in Various States in Regard to the Issuing of Permits for the Passage Over State Highways of Vehicles in Excess of Legal Weight and Dimensions; Should a State Curtail Its Road-building Program When General Business Conditions Are Prosperous? What Can Be Done to Keep States From Using Motor License Fees and Gasoline Tax for Other Purposes Than Construction and Maintenance of Roads? How Should the Various Types of Roads Be Classified in the Statistics Prepared by a State Highway Department?

Other group meetings will be held to discuss load design; bridge design, construction and maintenance; road construction problems; materials and research; traffic control and safety; accounting; road equipment problems, and roadside beautification.

American Engineer to Study Shanghai Water Supply

Nicholas S. Hill, Jr., president of the Hackensack (N. J.) Water Co., has been engaged by the municipal council of Shanghai, China, to make a study of the water supply of that city, especially of the financial administration of the Shanghai waterworks, a British-owned company.

Mulholland Dam Unsafe, Investigating Board Reports

A board of consulting engineers and geologists, commissioned by the Los Angeles board of water and power to investigate and make a report on the safety of the Mulholland Dam, in the Hollywood, Calif., hills (*ENR*, July 16, 1931, p. 113), has completed the report and submitted it to the water and power commissioners. Two members of the board, B. F. Jakobsen, consulting engineer, and Allan Sedgwick, geologist, reported the dam to contain deficiencies of structure and to be resting on geological faults. The sturcture, according to these two members, has an insufficient base width with no allowance made in its design for uplift or earthquake stresses, and the foundation is not properly terraced to provide against sliding of the dam on its foundation. Their report also shows that there is insufficient drainage in foundation and no drainage in the dam. Charles T. Leeds, consulting engineer, the third member of the board, has declared the dam thoroughly safe.

The reports have been turned over to H. A. Van Norman, general manager and chief engineer of the department of water and power, for further study.

Salvage Work Proposed for Omaha Unemployed this Winter

Although Omaha had relatively little unemployment last winter, city officials are considering for next winter various plans to reduce certain classes of unemployment. Roy N. Towl, a consulting civil engineer, recently elected as one of the five city commissioners, has proposed that a municipal director of salvage work be appointed for the double purpose of remedying financial and tax deliquent difficulties and dealing with the unemployment problem. He says:

"In every city there are tax deliquent properties and waste areas which may be reclaimed at small expense. These areas, if owned by the cities, would not be subject to taxation and could be used to produce revenues which would offset carrying charges and ultimately could be sold and thereby recoup the expense of developments."

Detroit Sues for $1,900,000 for Southfield Sewer Repairs

Suits have been brought in the Wayne circuit court by the city of Detroit against two firms of contractors, Lennane & McIlvenna and Julius Porath & Son, which built the collapsed sections of the Southfield sewer, and their bonding companies as codefendants, to recover $1,900,000 to cover the cost of repairs. Negligent, careless and improper work by the contractors is alleged in the bills of particulars.

Of the three counts in the suits the first is based on the fact that the sewer collapsed and was repaired, and asks that the contractors be held liable for the cost of repairs. The second declares that since the contractors did not properly carry out their contracts and deliver to the city a sewer according to the specifications the money paid should be returned with damages. The third is a general or common count to provide for legal contingencies that may arise.

The collapse of the sewer occurred in 1930 (*ENR*, July 3, 1930, p. 15). Later an investigating board divided the responsibility between the engineer and the contractors (*ENR*, Aug. 7, 1930, p. 210).

New Railroad Passenger and Freight Stations for Fort Worth

At a meeting in Fort Worth, Tex., of the Fort Worth Union Passenger Station Co., composed of the Atchison, Topeka & Santa Fe and the Southern Pacific, plans were adopted for a new passenger station, upon which construction will be started within 60 days, according to F. G. Pettibone, of Galveston, president of the Union Passenger Station Co. He said also that the Santa Fe will soon begin the erection of a new freight station in Fort Worth. It is expected that the St. Louis Southwestern will continue as a tenant of the new passenger station, which will occupy the site of the present station.

No estimates of the cost of the new buildings were made public. The passenger station will be 245 ft. long and 91 ft. wide. The freight house, which will be used only by the Santa Fe, will be situated approximately on the site of the present freight house. It will measure 50 by 410 ft.

Norfolk & Western R.R. to Build Fruit Terminal

The Norfolk & Western R.R. has closed contracts for the purchase of a block of property in Norfolk, Va., in the area destroyed by fire last June with a loss of about a million dollars. The railroad contemplates construction of the first unit of a produce and fruit terminal to serve local merchants and distributors, to be followed by a larger expansion when justified by conditions. The Norfolk & Western's plans for the development of the block is the first step of importance taken to rebuild the burned area. It is understood that the plans include facilities for motor trucks.

UNIQUE AIRPORT COMPLETED ON CATALINA ISLAND

This airport has just been completed on Catalina Island, 27 miles off the coast of southern California, at a cost of $250,000, and serves as headquarters of the new Wilmington-Catalina Airline, Ltd. It is designed primarily for seaplane operations, and comprises a steel and concrete hangar 60x80 ft.; a two-story administration building in which are housed waiting rooms, cafe and ticket office; a garden patio; a concrete ramp leading into the water at a 6 per cent grade, and an airplane turntable at the head of the ramp for swinging the seaplane around for the return trip. The airport is located in Hamilton Cove, adjacent to the cove occupied by the St. Catherine Hotel, and is a mile north of the resort town of Avalon. On account of the mountainous terrain, it was necessary to cut back the hillsides of the cove sufficiently to provide room for the runway, hangar and administration building. Two seaplanes are in use at present.

Navigation Improvements Proposed in Rhode Island River

Work of sounding the Seekonk River, in Rhode Island, to determine what improvements in navigation facilities should be made by the federal government has been begun by U. S. engineers. It has been suggested to remove Bold Point, to deepen the channel to 22 or 25 ft. and to widen the channel to 400 or 500 ft. at a total estimated cost of $1,000,000. Major Charles J. Taylor, district engineer, announces that a report of the survey, with recommendations, will be made to Congress in February.

Bridging Big Baltic Island Will Link Germany and Sweden

The Swedish State Railways has decided to loan the German Reichsbahn $5,000,000 for the purpose of bridging the Strelasund, the strait dividing the large Baltic island of Rügen from the German mainland. At present much time is lost on the direct German-Swedish mail route via the Sassnitz-Tralleborg train ferry.

Details of this project, which resembles the railway link constructed a few years ago between the Malay Peninsula and the island of Singapore, are now available. As at Singapore, and in the case of the rail connection just completed between Schleswig-Holstein and the island of Sylt in the North Sea, the intervening channel will be crossed by a causeway. A new railway, 4 kilometers long and double-track throughout, is to be built on the causeway, passing over the harbor mouth and the small island of Däneholm, thence across the Strelasund to Altefähr, where it will connect with the Rügen railway system close to the existing train ferry station.

The causeway, which is to be made of broken stone faced with rubble, will be 328 ft. wide at its base, tapering to 58½ ft. on the crown of the embankment, and will run in a straight line from shore to shore. Half of the breadth on the top will be occupied by the new railway, and half by a new highway linking the Prussian provincial road system with the island roads leading to the fashionable watering places on the Rügen coast. There will be two small bridges on the causeway, both provided with movable spans for the passage of small boats.

The work of constructing the causeway is expected to take 3½ years. One condition attaching to the loan, on which interest is to be paid at 5 per cent, is that Swedish concerns shall be allowed to bid on the stone required on equal terms with German quarry owners.

The Business Outlook

By Labor Day August will have probably put in its claim for the closely contested honor of being the much-heralded, honest-to-goodness bottom, and may win by the nose of an index number over July and last December. The endurance dance of this unduly prolonged depression ought by all odds to end this month, if ever. Precedent of 1921 favors this hopeful prospect, for in the summer of that year stocks and trade sloshed along in uncertain stagnation, as they have this time, until September. A strikingly similiar advance improvement in textiles and other consumer industries, accompanied by sporadic strength in individual stocks standing out from the general list, has appeared. Commodity price levels have shown unusually early and prolonged stability, and exports seem to have reached a resistance level.

—The Business Week, Sept. 2.

Activities of A.S.T.M. Timber Committees

During the coming year committee D-7 on timber of the American Society for Testing Materials will take up the revision of the present tentative specifications for timber piles and it is hoped a final recommendation can be made next year. Herman von Schrenk, consulting timber engineer, St. Louis, Mo., is chairman of the committee. Timber preservatives, including creosote, are to be further investigated by the subcommittee on these products. The committee on moisture content of timber is continuing its studies on standard methods for the determination of this content.

New York Firm to Build Two Texas Bridges

Bids were opened Aug. 25 by the Louisiana highway commission for the construction of two bridges across the Atchafalaya River. The Foundation Company, New York, was the successful bidder with low bids of $1,028,019 for the bridge at Morgan City and of $878,238 for the span farther upstream at Krotz Springs. Both spans are included in the major highway improvement program financed by the $68,000,000 bond issue secured by the gasoline sales tax.

Mountain Gas-Pipe Line in Montana Nears Completion

On Sept. 1 the 200-mile 20-in. pipe line from the gas field north of Yellowstone National Park to Butte and Anaconda, Mont., was completed. This project represents one of the most difficult tasks of pipe-line construction yet undertaken. Only about 90 calendar days were available for actual construction, and the line for much of the length ran through very mountainous country, involving considerable trenching through solid rock. About 30,000 welded joints and 30,000 tons of steel were involved in the work. Winston Bros., Inc., Minneapolis, Minn., is the contractor on the work.

Laying Montana gas pipe line in streambed in Wolf Creek Canyon

Caterpillar Tractor Photos

Gas line pipe laying in more open country

Hoover Dam Notes

Striking workmen at Hoover Dam voted Aug. 16 to call off the strike. As a consequence work proceeded as usual during the following week. At the close of work on Aug. 22 the Nevada adit was in 120 ft. from the intersection of tunnel No. 2. The Arizona adit had progressed 404 ft. from the intersection with tunnel No. 3. Tunnel No. 2 has been driven 147 ft. upstream from the Nevada adit and 223 ft. downstream. Tunnel No. 3 is in 250 ft. upstream and 400 ft. downstream from the Arizona adit.

Concrete investigations are being carried forward. Tests have been started on dry pretempered cements. A test of wet pretempered cement has been repeated, with the premixing time extended to 5½ hours. A full report on these tests will not be made until after the cylinders are broken. Erosion tests are being made by the application of water at high velocities at the Guernsey dam. One concrete block subjected to a jet angle of 90 deg. and a velocity of 175 ft. per second has been under test for 24 days. Mass concrete strength tests are being carried forward in the Denver laboratory. To compare two methods of mechanical vibration with hand-tamped concrete, 131 cylinders 6x12 in. were cast as well as 24 8x16-in. cylinders. To determine the relative effect of neat cement caps, plaster of paris caps and ground caps a set of 24 8x16-in. cylinders was cast. Designs have been completed for a compressometer for measuring deformations on various sizes of test cylinders.

Six Companies has completed the construction of 64 small cottages and six larger residences in Boulder City. The water system at Boulder City is practically complete. Requisition has been made for the chemicals needed for water purification.

Section of Trans-Canada Highway Through Ontario to Be Built

In pursuance of the policy of the dominion government for relief of unemployment an agreement has been entered into with the provincial government of Ontario for the construction of the section of the trans-Canada highway within that province. The province will have charge of the work, and will decide upon the route to be followed, the cost of the undertaking to be divided equally between the two governments.

It is estimated that about 10,000 men will be required for the work, and the various municipalities are asked to furnish returns by the end of the month as to the number of unemployed who are available for the work. Camps for their accommodation are being established at several points in northwestern Ontario, and active preparations are going forward for the transportation of the necessary supplies and material, so that operations may be commenced with as little delay as possible.

The road will probably continue through Quebec City to Montreal, from that city up the valley of the Ottawa to North Bay, thence north to Hearst and west to Heron Bay.

Quebec Has Extensive Program of Highway Work

The Province of Quebec, Canada, is providing for relief of the unemployed by carrying out an extensive program of highway construction and improvement, employing about 35,000 men who would otherwise be out of work and dependent on charity. The construction and maintenance of good roads by the provincial government has resulted in a considerable increase in tourist traffic.

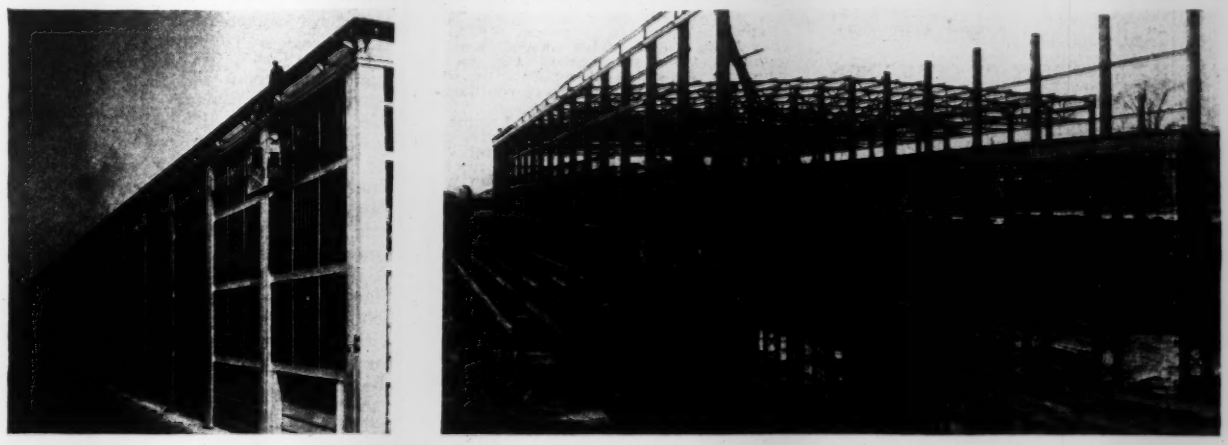
Toledo Plans New Water Supply

A new water supply to be taken from Lake Erie is being planned for Toledo, Ohio. The city takes its present supply from the Maumee River and purifies it in a plant that was put into operation in 1910. Increasing quantity demands make an extension of the supply imperative, and Lake Erie water is largely free from the high pollution of the Maumee River and is less than half as hard. The present plans call for the abandonment of the present supply and the construction of a new lake intake, tunnel and purification plant on the lake-front, northeast of the city.

The first undertaking in the program is to be the construction of 16,000 ft. of 6-ft. concrete tunnel from one of the existing pumping stations in the city to the downtown district. When the tunnel has been completed there will be laid in it a steel main to convey pressure water to the downtown distribution system, reinforcing the present facilities. Later the pipe will be removed and the tunnel will become part of the system carrying low-pressure water from the new filter plant to the pumping station, with flow in the opposite direction. The 16,000 ft. represents about half the length of tunnel required to link up the proposed filter plant with the present pumping station.

Program for Municipal Engineers Meeting in Pittsburgh

The final draft of the program for the Pittsburgh meeting, Oct. 19 to 23, of the American Society of Municipal Engineers includes two technical sessions a day for three days. Among the subjects covered are the following: city planning, parks, terminal facilities and traffic control at airports, traffic light-



LARGE WINDOW AREA AND WELDED FRAME FOR INDUSTRIAL BUILDING

At Pittsfield, Mass., the General Electric Co. has recently completed a new shop for the manufacture of transformer tanks that involves several features of interest. The building is 550 ft. long and 150 ft. wide, the framework, involving 1,500 tons of structural steel, being entirely arc welded. All curtain walls are of glass in steel sash. A welded steel deck roof is utilized. Column pilasters are of welded sheet steel. The glass in the windows on the south and west sides is of a special actinic type that permits sunshine to enter without glare. The floor is an 8-in. concrete slab surfaced with 3-in. creosote-treated wood block paving. In one of the accompanying views the special window-washing apparatus, consisting of cars operating on a monorail that encircles the building just below the roof level, is shown.

ing and control, traffic education in college, enforcement and measure of traffic congestion, taste and odor removal from water, zeolite and lime-soda softening, drought lessons, economics of waste disposal, explosions in sewers, sewage settling, trade waste and lime-chlorine treatment, fees for sewage service, sewer assessing problems, budgeting and rationalizing municipal bond issues, taxation from bond investors' viewpoint, dedications and easements for engineering projects, repairing service cuts, low-cost roads, joint fillers and cushions, sampling. C. W. S. Sammelman, St. Louis, is secretary, and Charles M. Reppert, chief engineer, department of public works, Pittsburgh, is chairman of the local committee on arrangements.

Brief News

STUDIES for an interstate port at the south end of Lake Michigan are to be made by Rufus W. Putnam, consulting engineer, Chicago, as engineer and director of the Chicago Regional Port Commission.

A NEW BOOK on the port of Buffalo, N. Y., constituting the first of a series of publications to be brought out on the principal ports of the Great Lakes and their connecting channels, has been issued by the board of engineers for rivers and harbors of the war department and the bureau of operations of the United States Shipping Board. The report consists of 161 pages, is illustrated with original maps, charts and graphs and contains tabular data showing commodity movements.

A COVERED RESERVOIR is to be erected on the historic Plains of Abraham battlefield for the city of Quebec, Canada. Contract for the construction of the 30,000,000 gal. structure has already been awarded.

PLANS are under way for an extensive addition to the Boston airport which will require 2,600,000 cu.ft. of filling. Bids are to be advertised soon, with the stipulation that work must be completed in seven months.

A CONTRACT was signed Aug. 20 by representatives of the Erie Railroad and the Winston Brothers Construction Co., in Cleveland, Ohio, for the erection of a new station in Jamestown, N. Y., to cost $265,000. The Winston concern was the lowest of 30 bidders.

A TOTAL of 21,250 illegal and obsolete signs have been removed from Maryland's highways since the anti-billboard law went into effect June 1. More than 7,000 signs, complying with the law, remain.

STEEL SKELETONS for two- and three-story buildings are being produced in Germany by the Stahlbau Düsseldorf. The skeletons are fully fabricated in the factory—either welded or riveted—so that only assembly work is necessary at the site. It is said that the steel skeleton for a three-story building may be set up in two or three days and that costs are reduced from 8 to 10 per cent.

ESTABLISHMENT by private enterprise of a highly developed modern system of trunk line automobile roads joining the more important cities of Italy, ownership of which after 50 years will revert to the state without further compensation, is planned under projects now under way in that country.

A CALIFORNIA BUILDING CONGRESS has been organized to function as a clearing house of trade organizations and associations. It will operate as one of the industrial activities of the California State Chamber of Commerce. The activities of the congress will be similar to that of the New York Building Congress.

BIRMINGHAM, ALA., is to have a new railway station. The petition of the Atlanta, Birmingham & Coast Railroad for authority to withdraw from the Louisville & Nashville passenger station in that city and to erect one for its own use has been granted by the Alabama Public Service Commission. Bids for the new structure will be asked shortly.

SOCIETY CALENDAR

AMERICAN ASSOCIATION OF ENGINEERS, Chicago; annual convention, Huntington, W. Va., Sept. 28-30.

AMERICAN ASSOCIATION OF STATE HIGHWAY OFFICIALS, Washington; annual meeting, Sept. 28-Oct. 1, Salt Lake City.

AMERICAN PUBLIC HEALTH ASSOCIATION, New York; annual convention, Montreal, Sept. 14-17.

AMERICAN SOCIETY OF CIVIL ENGINEERS, New York City; fall meeting, St. Paul, Minn., Oct. 7-9.

AMERICAN SOCIETY OF MUNICIPAL ENGINEERS, St. Louis; meeting, Oct. 19-26, Pittsburgh.

AMERICAN WELDING SOCIETY, New York City; fall meeting, Sept. 21-25, Boston.

INTERNATIONAL CITY MANAGERS ASSOCIATION, Chicago; annual meeting, Oct. 7-10, Louisville, Ky.

INTERNATIONAL ASSOCIATION OF PUBLIC WORKS OFFICIALS, Chicago; conference, Sept. 24-26, New York City.

NATIONAL MUNICIPAL LEAGUE, New York City; annual meeting, Nov. 9-11, Buffalo, N. Y.

NATIONAL SAFETY COUNCIL, New York City; twentieth annual safety congress, Chicago, Oct. 12-16.

NEW ENGLAND WATER WORKS ASSOCIATION, Boston; annual convention, Sept. 29-Oct. 2, Boston.

AMERICAN INSTITUTE OF STEEL CONSTRUCTION, at its ninth annual convention at White Sulphur Springs, W. Va., Oct. 28-30, will devote most of the time to the problems of the industry, a review of conditions of the past year and an exchange of views on how steel construction can be advanced. The discussions will be divided equally between the technical problems of production and the economic problems of selling.

AMERICAN SOCIETY OF HEATING AND VENTILATING ENGINEERS announces that the first award of the F. Paul Anderson Medal will be made at the 38th annual meeting in January, 1932, in Cleveland, Ohio. This medal will be awarded to a member of the society who has performed an outstanding service for the art of heating and ventilating.

CITY ENGINEERS SECTION, League of Cities of the Third Class (Pennsylvania), was organized at the 32d annual convention of the league, at Bradford, Pa., Aug. 18-20. Officers of the section were elected as follows: president, J. Henry Quick, city engineer, Bradford; vice-president, Lyons Mussina, city engineer, Williamsport; treasurer, E. Clark Cowden, city engineer, Harrisburg; secretary, Francis J. Mulvihill, state municipal engineer, Harrisburg.

MISSOURI WATER AND SEWERAGE CONFERENCE executive committee has decided to hold a two-day conference at Jefferson City instead of the usual 2½-day meeting. The dates tentatively set are Oct. 22 and 23. Half a day will be devoted to a round-table discussion.

NATIONAL SAFETY COUNCIL, at the twentieth annual safety congress and exposition in Chicago, Oct. 12-16, will discuss in its construction division a co-operative program of practicable ways to reduce accidents and accident costs in the construction industry.

NEW YORK SECTION, American Water Works Association, will hold its annual convention in Niagara Falls Sept. 22-23. The local committee, under the chairmanship of Roy B. Suitor, is preparing an interesting program.

Personal Notes

I. RUSSELL RIKER, who since 1925 has been senior sanitary engineer for the department of health, State of New Jersey, has resigned to accept a position as resident engineer for the borough of Princeton on the construction of a trunk sewer and sewage-treatment plant.

Major CLARENCE L. STUREVANT, of the War College at Washington, D. C., has assumed charge of the Pacific Northwest district office of the U. S. Army Engineers in Seattle, Wash. He replaces Major JOHN S. BUTLER, who has been assigned to duty in Omaha.

F. M. PLAKE, of Kansas City, Mo., chief engineer of the Missouri Public Service Commission, has resigned, effective on Oct. 1, and will be succeeded by J. E. FLANDERS, of Paris, Mo. Mr. Plake will become valuation engineer for the Union Electric Light & Power Co., of St. Louis, Mo. He has been with the Missouri Public Service Commission for ten years, serving as chief engineer the past 4½ years. Mr. Flanders, a graduate of the Missouri School of Mines at Rolla, Mo., has been with the commission for ten years and for several years has been assistant chief engineer.

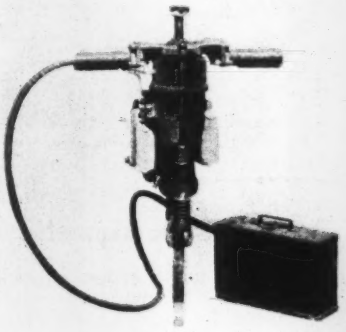
Obituary

CHARLES S. FISHER, a civil engineer and a member of the firm of Crocker-Fisher Contracting Co. of Denver, Colo., died in Dallas, Tex., Aug. 20, while supervising some bridge construction.

Construction Equipment and Materials

Gasoline-Driven Hammer Improved

Eleven pounds lighter in weight but with more power than the former model, a new gasoline-motor-driven portable tool with a weight of only 86 lb. has



Self-contained portable hammer

been placed on the market by the Rodax Corp., 110 South Dearborn St., Chicago, Ill. This is powered by a two-cycle motor, complete in itself, which needs no additional equipment. One of the refinements has been the elimination of the oil-cooling chamber with horizontal and movable fins, which is replaced by air cooling with vertical fins.

Movable Forms for Low-Cost Road Construction

In an effort to systematize the hitherto neglected field of low-cost road construction, the Heltzel Steel Form & Iron Co., Warren, Ohio, has brought out a trailing steel form for macadam pavement that can be moved longitudinally without dismantling. A section of this form and the method of operation are illustrated. Individual 10-ft. sections are coupled together in lengths of about 200 ft. and set to line and grade. Earth shoulders are banked against the outside, while stone is dumped on the subgrade by the ordinary method, using trucks and stone spreaders. The form serves as a support for both subgrade tester and surface guide, which are moved by hand. When a section of road has been completed a truck is hitched to the forward end of one length of form by means of a ⅝-in. cable passing through a pulley block. A steel stripper stake serves the double purpose of guiding the form and also cleaning it as it is pulled forward. As the length is trailed ahead, the stone and earth slump together behind it, leaving a small space about ¼ in. wide which does not require backfilling. The roadway and shoulder are then rolled and the pavement is completed in the usual manner. It is said that less than a minute is required to trail a 200-ft. length of form 150 ft. ahead. Various types, varying in height from 3 to 7 in., are available to meet highway specifications.

Self-Protected Ball Bearing

In its new Series 7000 closed-type ball bearing the Norma-Hoffmann Bearings Corp., Stamford, Conn., presents an all-steel, lubricant-packed, dirt- and moisture-proof bearing embodying the latest improvements designed to meet the growing trend toward simplification in mounting and lubrication and a reduction in cost of machining and assembling. Wide, solid inner and outer rings give maximum contact on shafts, and the design is such that the bearing can be clamped on both sides. It will carry substantial thrust loads in either direction, in combination with the radial load. The Greaseal feature consists of a substantial felt washer and a thin fiber ring interposed between split snap rings securely held in a groove in the outer ring. The inner ring is recessed to present a shoulder which, with the felt washer, forms an effective labyrinth as an added safeguard against escape of lubricant. There is ample space for grease, thus reducing the attention needed for proper lubrication. This precision ball bearing is made in a full range of sizes, and interchanges in over-all dimensions with all other makes of self-protected bearings.

Pump and Motor Mounted on Single Shaft

By mounting the impeller of a centrifugal pump on the extended shaft of an electric motor, and by using a single base for both units, the Worthington Pump & Machinery Corp., Harrison, N. J., has produced a simple and rug-

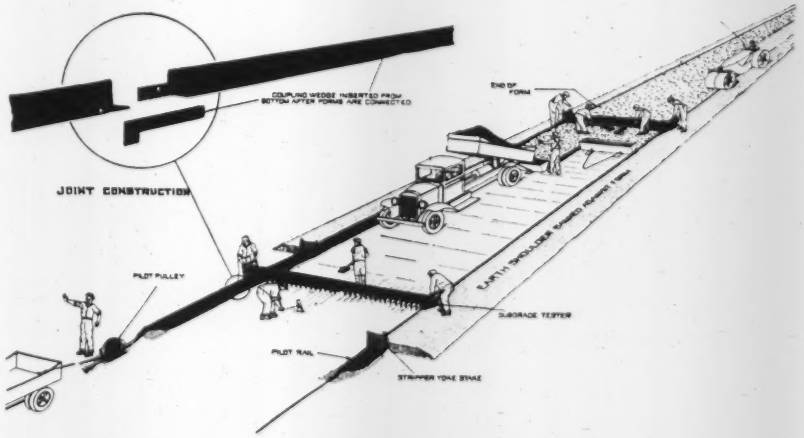
Compact centrifugal pumping unit

ged centrifugal pump unit intended to insure good service with little care and attention. The bronze impeller incorporates the shaft sleeve as an integral part, this construction being one of Worthington's latest shaft protection developments. Other features of the pump unit are a special cadmium-plated steel locking device for the impeller, a forged bronze packing gland, and the arrangement of shaft water-throwers. The driving motor is of the ball-bearing type of standard construction.

Two Convertible Excavators

Special attention has been given to balancing the various motions of hoisting, crowding, swinging and dumping in the new Model 32-B 1-cu.yd. Bucyrus-Erie convertible shovel-dragline crane-clamshell announced by the Bucyrus-Erie Co., South Milwaukee, Wis. Outstanding items of interest include a choice of gasoline, diesel or electric power; either rope or chain crowd on the shovel; extra long and wide mountings for soft ground dragline work; continuously running shafts mounted on ball bearings; gears inclosed and running in oil. To avoid binding, only two bearings are mounted to a shaft. Transmission gears are machine cut from solid steel. There is an outside band power take-off clutch and a

(Continued on p. 390)



Preparing to move sliding form on typical highway job

Current Construction Unit Prices

Stream Control Works on Swift River, Massachusetts

CONTRACT was let July 21, 1931, for the stream control work at the main dam of the Swift River reservoir in the towns of Belchertown, Enfield and Ware, Mass., for $560,923. Work consists of excavating and lining 1,100 ft. of tunnel and one shaft, excavating approach and outlet channels and open cuts at the portals and shaft head, and constructing appurtenant works, including embankments for cofferdams, control structure at the shaft, and 48-in. conduit line.

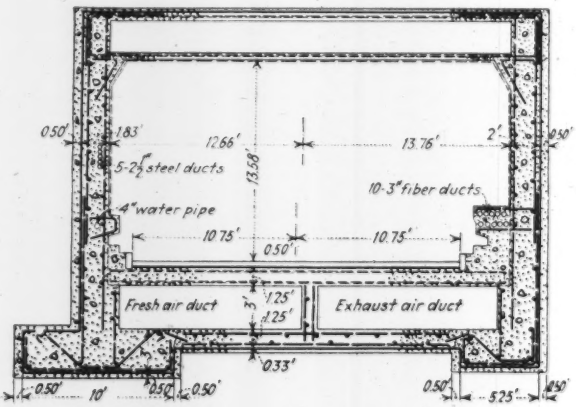
Nineteen bids were received and unit prices are given on the lowest three: A, Northern States Contracting Co., 312 Endicott Building, St. Paul, contract; B, Arundel Corp., Pier 2, Pratt St., Baltimore, $643,555; C, C. W. Blakesley & Sons, Inc., 58 Waverly St., New Haven, $659,285.

	A	B	C
45,000 cu.yd. excav. in shaft and tunnel	4.00	4.42	5.50
100 cu.yd. enlarge shaft and tunnel in rock	10.00	8.50	5.50
6,000 cu.yd. removal of soil	.53	.33	.50
240,000 cu.yd. earth excav. in open cut	.21	.34	.23
20,000 cu.yd. rock excav. in open cut	2.00	1.00	1.40
6,300 cu.yd. embanking	.40	.50	.60
120,000 cu.yd. refilling and embanking in 6-inch layers	.13	.17	.09
130,000 cu.yd. refilling and embanking	.10	.06	.15
2,000 cu.yd. concrete masonry in shaft	6.80	8.20	9
12,000 cu.yd. concrete masonry in tunnel and open cut conduit	5.45	8.50	7.60
650 cu.yd. concrete masonry in channel lining	4.55	5.75	7.80
2,800 cu.yd. concrete masonry	7.20	7.24	8.75
100 cu.yd. excess concrete masonry in shaft and tunnel, $3.00	3	3	3
200,000 pound structural steel roof support in tunnel	.06	.058	.065
20 M.ft.B.M. timbering in tunnel	100	78	125
200 cu.yd. dry packing	2.50	5.70	2
500 lin.ft. drilling holes in rock or masonry	1	.50	.40
5,000 lin.ft. steel pipe for grouting, etc.	.35	.40	.25
200 connections for grouting	1	5.70	1.10
1,500 ton sand for grout	2	2.50	2.50
1,000 cu.yd. mixing and placing grout	4	4.25	5
30,000 bbl. portland cement	2.50	2.40	1.95
50 lin.ft. gunite protective coating of tunnel rock	12	10	5
125,000 lb. reinforcing steel	.04	.04	.039
125,000 lb. structural steel	.08	.06	.067
40,000 lb. cast-iron pipe and special casting	.05	.04	.05
50,000 lb. misc. iron and steel	.08	.06	.07
1,000 lb. galvanizing	.05	.03	.07
1,000 lb. misc. bronze, brass and copper	.50	.78	.50
4,000 lb. caring for and setting metalwork furnished by commission	.03	.02	.03
20 M.ft.B.M. timber and lumber	80	100	90
1,000 cu.yd. riprap	2.25	1.15	3
1,000 cu.yd. paving	6	2.10	4
400 cu.yd. crushed stone, gravel and sand	2	2.40	1.50
250 lin.ft. tile pipe	.50	.70	.50
18 months medical and hosp. services	100	140	100
18 months sanitary services	50	210	200
Locker house	2,000	4,300	2,000
Drainage and river control	2,500	9,300	10,000
970 lin.ft. 48-in. conduit	13	20	15
Cleaning up	1,000	4,300	500
Totals	$560,922.50	$643,554.50	$659,285.00

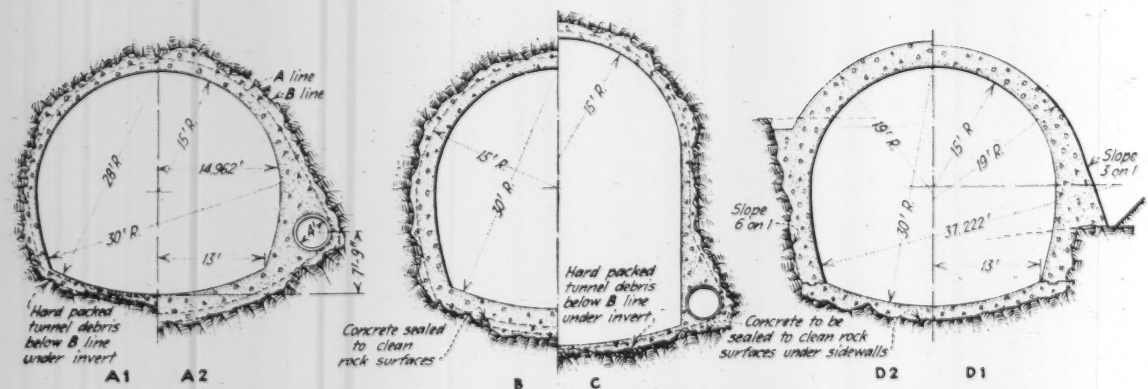
Tunnel Section Type	Unsupported Sections: Net Inside Area Sq.Ft.	Unsupported Sections: Area to B Line Sq.Ft.	Unsupported Sections: Quantities to B Line Per Lin.Ft. of Tunnel: Excavation Cu.Yd.	Unsupported Sections: Quantities to B Line Per Lin.Ft. of Tunnel: Concrete Cu.Yd.	Supported Sections: Approx. Area to B Line Sq.Ft.	Supported Sections: Approx. Quantities to B Line Per Lin.Ft. of Tunnel: Excavation Cu.Yd.	Supported Sections: Approx. Quantities to B Line Per Lin.Ft. of Tunnel: Concrete Cu.Yd.	Supported Sections: Approx. Quantities to B Line Per Lin.Ft. of Tunnel: Steel Lb.
A1	689.73	902.62	33.43	7.42	978.0	36.22	10.22	1,700
A2	689.73	1,044.20	38.67	12.67	1,139.3	42.20	16.19	1,700
B	750.56	1,076.76	39.88	12.08	1,141.2	42.27	14.47	1,650
C	1,034.94	1,296.62	38.02	9.23	.....	.....	.....	.....

Section B of Boston Traffic Tunnel

SECTION B of the Boston traffic tunnel is located in the vicinity of North St. between Cross St. and North Square, Boston, and consists of construction by cut and cover method of a steel and concrete tube 435 ft. long. Contract was awarded in July to the C & R Construction Co., 75 Bradeen St., Roslindale, Mass., on its low bid of $259,525. Part of



Typical section, Boston traffic tunnel



Typical sections of tunnel and open-cut conduit for Swift River reservoir

Current Construction Unit Prices

the work is on the site of a group of municipal buildings under way on North St. between Cross and Richmond Sts.

The 5,000 cu.yd. of concrete in the third item is proportioned as follows: 1 bbl. cement to 9 cu.ft. sand, 15 cu.ft. crushed stone and 6½ gal. water. The small-stone concrete in the fourth item is mixed in the same manner but with crushed stone ⅜ and ¾ in., and is placed where reinforcing rods are spaced closely and around structural steel beams, columns and ducts. Mortar consists of 1 bbl. cement to 8 cu.ft. sand. Cinder concrete consists of one bag cement to 8 cu.ft. sand and 10 cu.ft. soft coal cinders. Granolithic wearing surface is 1 in. thick and of 1 bbl. cement to 4 cu.ft. sand.

Nine bids were received ranging from $259,525 to $471,988. The contract price is 20 per cent below the second bid and 28 per cent below the average. Unit prices are given of the lowest three bidders: A, C & R Construction Co.; B, M. F. Gaddis, Boston, $326,280; C, Joseph P. McCabe, Inc., South Boston, $328,493. Ernest R. Springer is chief engineer of the Boston transit department.

	A	B	C
15,000 cu.yd. earth excav.	$3.00	$7.00	$6.50
600 cu.yd. masonry removed	5.00	7.00	6.50
5,000 cu.yd. concrete	10.00	20.00	18.00
200 cu.yd. small stone concrete	16.00	22.00	18.00
50 cu.yd. mortar	20.00	30.00	12.00
500 cu.yd. cinder concrete	10.00	9.00	15.00
400 sq.yd. granolithic surface	1.00	1.00	1.00
10,000 sq.ft. precast concrete slabs	.32	.20	.25
50 cu.yd. 1:4 grout	5.00	10.00	10.00
50 cu.yd. neat grout	5.00	20.00	20.00
50 cu.yd. brick masonry	40.00	35.00	40.00
20 lin.ft. 6-in. cast-iron pipe	4.00	2.00	2.00
425 lin.ft. 4-in. c.-i. pipe	1.00	2.00	1.50
500 lin.ft. 8-15-in. vit. clay	.50	1.00	4.00
325 tons structural steel	65.00	85.00	70.00
250 tons reinforcing rods	50.00	80.00	65.00
12,000 sq.ft. wire cloth	.08	.20	.10
16,000 sq.yd. waterproofing fabric	.40	.40	.90
4,400 lin.ft. 3-in. fiber duct	.20	.15	.30
2,100 lin.ft. 1-in. steel conduit pipe	.20	.20	.20
2,150 lin.ft. 2½-in. steel conduit pipe	.50	.60	.45
Total	$259,525	$326,280	$328,493

Concrete Arch Railway Bridge, Belleville, N. J.

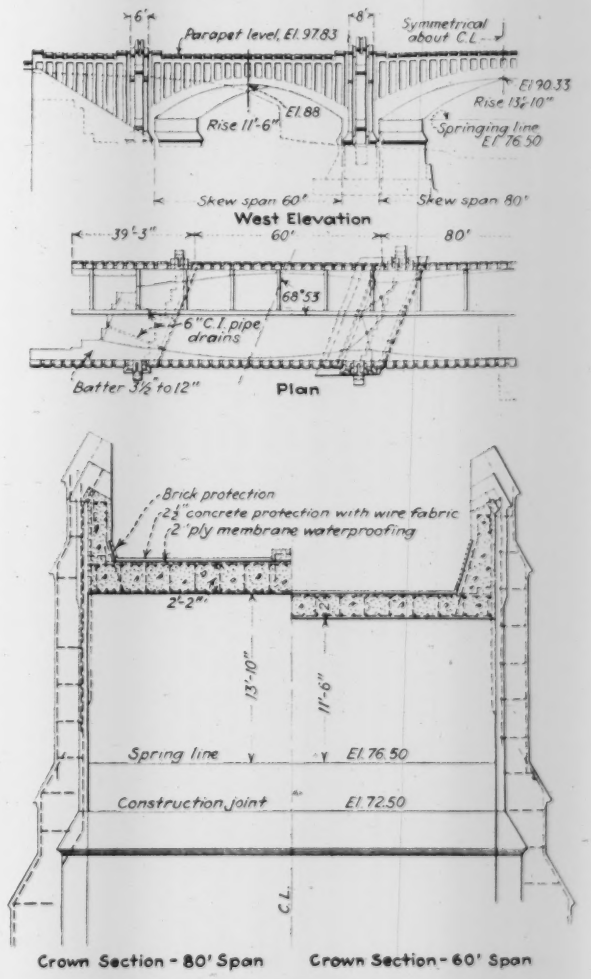
ESSEX COUNTY Park Commission, Newark, N. J., let a contract on July 2, 1931, for a three-span reinforced-concrete arch bridge to cost $102,925. The bridge, 296 ft. long and 33 ft. wide, will carry the tracks of the New York & Greenwood Lake (Erie) Railroad over the Second River ravine near the Soho station, Belleville, N. J. Work includes dismantling the existing structural-steel railroad bridge and constructing 600 lin.ft. of concrete revetment walls to confine the flow of Second River. The project is part of the proposed improvement extending Branch Brook Park north from Heller Parkway in Newark and Belleville.

The first five unit price items are for excavation. Class A includes removal of rock for the construction of walls, piers and abutments; Class B is for earth excavation for the foregoing purpose. Class C is removal of earth for the construction of the revetment walls along Second River. Boulders and loose rock are included. Class D is for earth excavation for the above purpose. Class E is rock excavation necessary to change the course of Second River. Disposal is within a radius of half a mile.

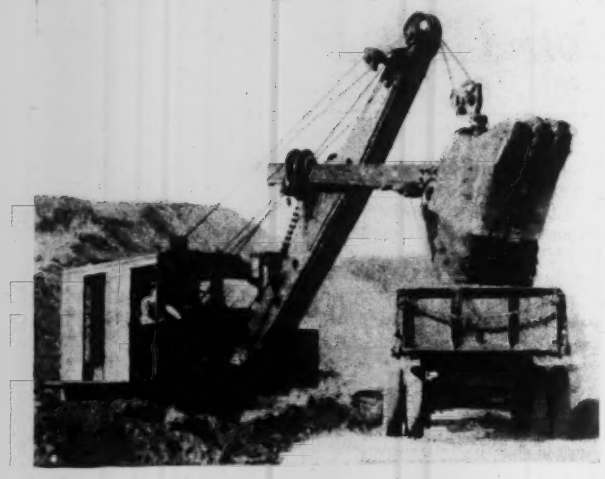
The next three items are for concrete. Class A is 1:4½; Class B 1:5½; Class C 1:7. Class A is used in the arch ring and in the piers above the construction joint. Class B is in all bridge walls, parapets and pilasters, piers below El. 72.5, in abutments below the inclined skewback at springline elevation, and in waterproofing protection. Class C is in the revetment walls. Coarse aggregate is ¼ to 2 in. for Classes A and B and ¼ to 3 in. for Class C. Ultimate strengths of the concrete are 3,000 lb. for A, 2,500 lb. for B and 2,000 lb. for C.

Nine bids were received ranging from $102,925 to $145,924. Unit prices are given of the lowest three bidders: A, John W. Heller Co., 1878 Springfield Ave., Maplewood, contract; B, Gray Construction Co.; C, Tuller Construction Co. A. B. Cohen, New York, is consulting engineer.

	A	B	C
Cl. A rock excav. for walls, piers, abutments	$2.50	$7.50	$4.00
Cl. B earth excav. for walls, piers, abutments	1.50	1.00	2.00
Cl. C earth excav. for revetment walls along Second River	2.00	1.00	2.00
Cl. D earth excav. to change course Second River	.75	.75	1.30
Cl. E rock excav. to change course Second River	3.00	10.00	8.00
Cement in place in all classes concrete	2.00	2.00	2.50
Cl. A concrete (exclusive cement) in arch rings and part of piers	18.50	17.80	18.00
Cl. B concrete (exclusive cement) in walls, parapets and pilasters	17.50	14.40	14.00
Cl. B concrete (exclusive cement) in piers below El. 72.5	12.00	11.50	12.00
Cl. C concrete (exclusive cement) in revetment walls	9.00	14.00	10.00
Waterproofing	.30	.35	.22
Steel reinforcing	.04	.04	.04
8-in. vitrified pipe	.50	.50	.50
Dismantling structural steel bridge	1,000.00	.00	1,000.00
Disposition of above bridge	500.00	2,300.00	100.00
Installing Presdwood or equivalent, sq.ft.	.05		.07
Total	$102,925	$105,295	$106,136



Elevation, plan and typical section of concrete arch bridge



1-cu.yd. power shovel

Convertible Excavators

(Continued from p. 387)

positive power dipper trip. The shovel has a box girder boom and outside handles, a single-shaft driven caterpillar mounting and an inserted tooth dipper.

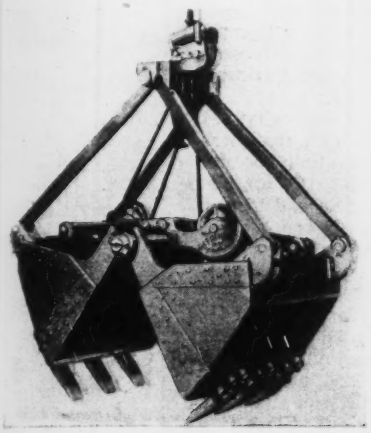
Another new machine recently put in production by the Bucyrus-Erie Co. is the 21-B ¾-yd. gasoline, diesel or electric convertible shovel-dragline-crane-clamshell. Features of this unit include a power dipper-trip, oversize clutches and brakes, hoist clutches power set, double-operating chocking brakes applied from the operator's stand, a swing brake and adjustable operating levers. When moving, the machine is steered from the operator's stand with the cab in any position; the propelling brake is also controlled from the stand, and a friction brake locks the swing during propelling. The new 3-side-vision cab provides the operator clear visibility of all parts of the work from his seat. Ball bearings are provided for all continuously running shafts. Careful attention has been given to accessibility and convenience in oiling and greasing. Both reversing transmission, for swinging and propelling, and engine transmission are fully inclosed and run in oil.

Lightweight Cutting Torch

Production of a lightweight cutting torch known as the Rego CC has been announced by the Bastian-Blessing Co., Milwaukee, Wis. The weight of this unit is only 46 oz. with tip attached, and it has an over-all length of 20¼ in. from base of handle to end of tip nut. Tips are available for use with acetylene, hydrogen, carbohydrogen, oxy-acetylene, liquefied petroleum gases such as butane and propane, and city or by-product coke gas. Tips are fastened to the head by a ⅞-in. hexagon brass nut that permits the torch head to lie close to the work. The head itself is of drop-forged Monel metal, permanently assembled to the seamless drawn Monel metal torch tubes. Four head angles are available: 90, 75 and 35 deg. and straight. All of these are quickly interchangeable. The mixer head is located at the front end of the torch handle and is made of forged brass. It serves as a means for securing the torch tubes and incloses the mixer, which is an independent unit, readily removable. Heavy-gage brass tubing, deeply knurled, forms the handle. The valve body is a brass forging with oxygen and acetylene preheat control valves and a high-pressure cutting valve machined integral with the body. The high-pressure valve seat mechanism is in the form of a complete assembly located between the hose connections, where it is quickly accessible and yet protected from damage. The seat is a special composition with exceptional wearing qualities and is permanently assembled in an inexpensive seat holder. The handle, made of drawn stainless steel, is furnished in two positions, for operation with the third and little finger or with the thumb.

Clamshell Bucket Designed for Hard Digging

The use of powerful double-fulcrum two-lever closing arms attached to both shells which force the bucket deep into the material is a feature of the Type N clamshell bucket announced by the Joseph F. Kiesler Co., 935 West Huron St., Chicago, Ill. Cutting edges and the shape of the shells are designed to dig sticky material freely. All parts of this unit are built extra heavy for continuous service and long life. The cable reeving is simple, avoiding side leads or S bends. Specially grooved sheeves of large diameter are used, with a short cable pull providing for fast operation with efficiency.



Clamshell digging bucket

New Publications

Portable Compressors—Gardner-Denver Co., Quincy, Ill., has issued a new 32-p. bulletin PC4 illustrating and describing various sizes and mountings of portable air compressors.

Excavators—A 24-p. illustrated bulletin describing the 32-B 1-cu.yd. convertible excavator with gasoline, diesel or electric power has been issued by the Bucyrus-Erie Co., South Milwaukee, Wis.

Tractors—The complete line of Twin City industrial tractors and power units, available in sizes from 25 to 140 hp., is described in an 8-p. illustrated booklet issued by the Minneapolis-Moline Power Implement Co., Minneapolis, Minn.

Chain Drives—A new and complete 56-p. catalog on stock Morse silent chain drives, which gives necessary information for selection, has been issued by the Morse Chain Co., Ithaca, N. Y.

Research—American Society of Heating and Venntilating Engineers, 51 Madison Ave., New York City, has published a 32-p. booklet outlining current activities of the research laboratory of the society and its accomplishments.

Glass Inclosures—Construction and uses of glass inclosures for sludge beds and trickling filter beds are treated in catalog GE31, a 24-p. illustrated booklet issued by the American-Moninger Greenhouse Mfg. Corp., 1947 Flushing Ave., Brooklyn, N. Y.

Water Treatment—Bulletin 28 of the Paradon Co., Arlington, N. J., contains a description of the new Paradon solution feed chlorinator, constructed under Ornstein patents.

Grading Equipment—A 16-p. catalog on Roadlayer tracks, used on equipment manufactured by the La Plant Choate Mfg. Co., Inc., Cedar Rapids, Iowa, is now being distributed by that company.

Grouting—How a number of difficult construction and repair problems involving groundwater, foundation, reservoir leakage and other difficulties were solved is told in a 20-p. bulletin 301 dealing with the Francois cementation process which has been published by the Dravo Contracting Co., Dravo Building, Pittsburgh, Pa.

Bridge Floors—Design and construction of the T-Tri-Lok heavy-duty bridge floor, a type of construction using structural tees in combination with lighter flat bars and concrete filling, is covered in great detail in a 22-p. booklet of the Carnegie Steel Co., Pittsburgh, Pa.

Concrete Production Equipment—Catalog 1302 of the Blaw-Knox Co., Pittsburgh, Pa., illustrates and describes representative units of equipment for the storage, measuring and handling of bulk materials and for the production and hauling of concrete, including batcher plants, steel storage bins, measuring equipment, truck mixers and agitator truck bodies.

Scraper Mucking Hoists—Catalog bulletin 76-N of the Sullivan Machinery Co., 400 North Michigan Ave., Chicago, Ill., covers its entire line of electric hoists from 7½ to 75 hp., also larger sizes of Turbinair hoists with compressed air motors. It contains 24 pp. and many illustrations.

Wire Rope—A 280-p. general catalog and handbook dealing with wire rope and wire has been issued by John A. Roebling's Sons Co., Trenton, N. J. This not only describes the products of the company but gives many practical hints and considerable engineering data on the application, uses and methods of treatment found most desirable in practice.

Asphalt Paving—Two recent publications of the Asphalt Institute, 801 Second Ave., New York City, are: "High Speed Production on Asphaltic Concrete Paving Work," an article by R. W. Edwards and N. L. James, of the U. S. Bureau of Public Roads, reprinted from the February, 1931, issue of *Public Roads*; and the first of a series of booklets describing constructive achievements in leading American cities in asphalt paving. The latter covers experience in Columbus, Ohio.

Business Side of Construction

August Contracts Smallest Recorded Since January, 1925

August contracts averaged only $37,000,000 per week, against $49,000,000 for July, and $60,000,000 in August, 1930. Thus was recorded the lowest rate since January, 1925, when the rate was $37,000,000 per week. The drop was in all classes of construction except federal government and unclassified public structures. Both streets and roads, and public works as a whole, dropped 37 per cent from the volume recorded last year.

Geographically, the only gain was in the Middle Atlantic states, where both private and public construction exceeded the figures for August, 1930. In the region between the Mississippi River and the Rocky Mountains, the decrease was negligible. Severe drops were in New England, the South and the Middle West.

Contracts for the eight months totaled $1,788,000,000, against $2,354,000,000 in 1930, a drop of 24 per cent. Public works volume is 5 per cent above that of last year, although its largest component, streets and roads, has dropped slightly below the 1930 volume. Classes ahead of last year are: waterworks, 28 per cent; public bridges, 19 per cent, and federal government, 136 per cent.

All the principal sections of the country participate in the decline in money values of contracts, except the Far West, which registers a small surplus. The drop east of the Mississippi is 29 per cent, and in the West the falling off amounts to 18 per cent.

Prevailing Wage and Hiring of Outsiders Cause Disputes

Building laborers appear to be facing many difficulties with public-works awards, which to a very great extent were designed especially to help reduce unemployment.

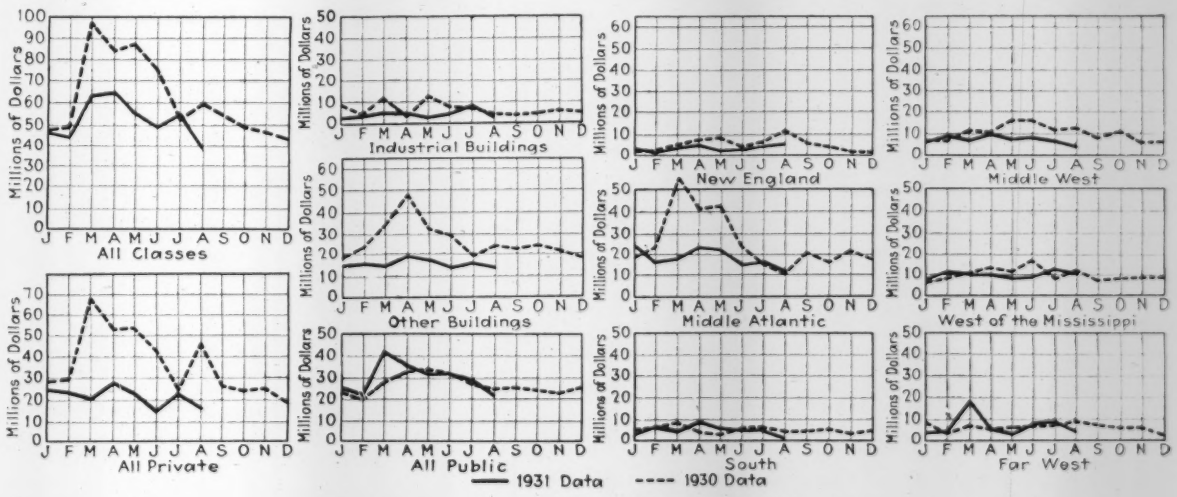
In closed-shop cities the laborers assume quite generally that the union rate is the prevailing rate. This is the case in the Route 25 bridge controversy in New Jersey, where a rate of $14 per day actually prevails, while the unions insist that $16 is the prevailing rate because it is their official schedule. Where public-works projects are awarded to firms outside the locality, such firms bring in their own forces. Thus the local purpose of the public award is voided. On the other hand, if work is awarded to local bidders only, costs are likely to be higher than when there is competition.

Unemployment in the building trades of the country gained 1 point in August; according to the American Federation of Labor, it was 51 per cent, against 39

ENGINEERING CONSTRUCTION CONTRACTS REPORTED IN AUGUST, 1931

Thousands of Dollars (000 omitted)

	New England	Middle Atlantic	South	Middle West	West of Mississippi	Far West	United States Aug., 1931	United States Eight Months 1931	United States Eight Months 1930	Canada Aug., 1931
Waterworks	$73	$401		$277	$196	$206	$1,153	$41,255	$32,057	$1,164
Sewers	286	2,113	$198	2,403	698	361	6,059	47,529	57,059	58
Bridges, public	262	3,639	176	633	1,995	204	6,909	86,589	72,811	917
Excavations	253	90	107	635	140	486	1,711	15,449	15,000	121
Streets and roads	3,234	6,238	1,955	3,795	11,170	4,696	31,088	424,550	436,058	4,471
Federal government	394	25	1,683	855	3,265	4,617	10,839	181,658	76,524	
Unclassified, public	254	4,572	125	408	119	512	5,990	59,734	77,872	200
Buildings, public	4,680	8,115	795	2,065	1,188	1,861	18,704	167,618	208,431	684
Total public	9,436	25,193	5,039	11,071	18,771	12,943	82,453	1,024,382	975,812	7,615
Buildings, industrial	1,419	3,714	1,020	1,905	1,268	2,475	11,801	119,756	256,790	882
Buildings, commercial	9,100	17,520	.....	2,840	2,450	1,346	33,256	402,217	751,268	1,845
Bridges, private	.....	52	.....	.....	85	.....	137	8,965	11,511	15
Unclassified, private	65	1,375	.....	238	18,226	1,350	21,254	232,838	358,591	825
Total, private	10,584	22,661	1,020	4,983	22,029	5,171	66,448	763,776	1,378,160	3,567
August, 4 weeks	**20,020**	**47,854**	**6,059**	**16,054**	**40,800**	**18,114**	**148,901**	.....	.....	**11,182**
July, 1931, 5 weeks	20,200	82,724	25,277	41,827	34,315	40,767	245,110	.....	.....	6,005
August, 1930, 4 weeks	47,823	41,104	19,239	54,107	43,912	33,407	239,592	.....	.....	29,505
Eight months, 1931	134,727	657,237	177,146	275,427	302,508	241,113	.....	1,788,158	.....	75,858
Eight months, 1930	200,186	966,843	190,636	396,669	365,363	234,275	.....	.....	2,353,972	130,738



Contracts awarded, showing trend by classes and sections

per cent in 1930. Local conditions are given below.

Boston—Action taken Aug. 5 by executive council granting preference on public work to state contractors. Many business interests, including roadbuilders, question wisdom of council's action because outside contractors may discontinue purchasing from Boston materials dealers. Furthermore, Massachusetts contractors obtain more contracts in neighboring states than do outsiders in Massachusetts.

Albany—Order giving preference to local laborers on all municipal projects effective Aug. 12.

New York—Appropriation of $2,000,000 Aug. 24 will enable 15,670 men to continue in emergency jobs on municipal projects at three days a week until the end of October; 15 per cent is for wages.

Baltimore—500 eligibles on list of city service commission will receive employment under new plan providing for a layoff of one day each month for those now regularly employed.

Washington—Contractor on painting job at Internal Revenue Building charged by unions with violation of Bacon-Davis prevailing-wage law, in paying rates as low as $8 per day. Treasury notified contractor Aug. 18 that the union rate of $11 per day must be paid.

Pittsburgh — Electrical contractors struck on fourteen construction jobs, demanding $15 per day for foremen on contracts of $2,000 or over as against $13.50 now.

Youngstown—Strip mills at Warren resumed operations Aug. 19 after a week's shut-down. Idle tin-plate mills expected in operation this week.

Chicago—A prevailing-wage law for Illinois, in effect the last two months, recognizes union rates as the prevailing rates, according to the Building Construction Employers' Association. Contractors who pay less than scale will have the difference deducted from payments due them at time of settlement; second violation will bar contractor from further bidding on public work.

Springfield—State road program tied up Aug. 13 by disagreement over formation of board to hear appeals on wage rates. Minimum wage on road work is quoted by state law. Laborers appealed minimum named, but board of appeals failed to act, because contractors claimed lack of proper representation.

Detroit—Plans approved for provision of jobs for 12,000 idle men on grading, ditching, landscaping and other municipal work to start soon. Facing a deficit of $22,000,000 for the last fiscal year, city will ask for voluntary contributions to a fund of $10,000,000 for unemployment.

Lansing—All contractors on state buildings will be compelled, according to wage policy adopted Aug. 19, to include in their bids wage scales for both skilled and common labor.

St. Paul—Minimum wage of 45c. per hour and minimum week of 48 hours prescribed by Minnesota highway code is meeting with strenuous objection by contractors not using mechanical equipment. Residents of Cook, Minn., and vicinity claim that contractors on local state work are paying wages below minimum and are not employing local workers.

Denver—Colorado Fuel & Iron Co. reduced miners' wages 15.6 per cent, to $5.40 per day. Rent of company houses was reduced 20 per cent. Denver & Rio Grande Western Railroad petitioned by employment committee to use no laborers other than residents of Colorado on Dotsero cutoff project.

Las Vegas—Operations at Hoover Dam involving 1,300 men stopped Aug. 10 because of the heat and a strike of 200 men for higher wages and improved conditions. Work resumed Aug. 14, with the strikers still out, but the strike was called off on Aug. 16. Central Trades Council claims that despite recent advance of 50c. per day, wages of common laborers are $1 under prevailing Nevada scale, while those of carpenters are $2.40 below prevailing rate for that craft.

Santa Fe—New Mexico highway department reduced working hours Aug. 15 of all maintenance and construction men from nine to eight hours.

Sacramento—Labor law, effective Aug. 14, prohibits employment of aliens and non-residents of the county in which state projects are being constructed. Sufficient volume of highway work in view to furnish employment for 9,000 additional men.

Los Angeles—Employment on $21,000,000 San Gabriel Dam confined to those who have resided over one year in the state and over three months in the county. Official prevailing-wage schedule for public works became effective Aug. 14.

Materials Notes

Steel—A larger volume of reinforcing bar tonnage is now in prospect than at any other time this year; but foreign competition has reduced the price 5c., to $1.55. Structural steel sold at the rate of 15,000 tons weekly during August, or less than a quarter of the weekly rate of 66,000 tons for August, 1930. Prices hold at July level of $1.60.

Clay Products—Brick prices dropped $3 per thousand, to $12 delivered Pittsburgh; 50c., to $12.50 New York. Sewer pipe declined at Cleveland and Cincinnati and hollow tile at St. Louis and San Francisco.

DECREASE IN MATERIALS MOVEMENTS FROM 1930

	1931	1930	Per Cent Ch'ge in 1931
Fabricated Structural Steel:			
Bookings, 7 mos., tons	1,287,200	1,768,800	—27.2
Shipments, 7 mos., tons	1,140,000	1,878,800	—39.0
Fabricated Steel Plate:			
New orders, 7 mos., tons	189,176	301,721	—37.2
Steel Castings:			
New orders, 7 mos., tons	279,196	641,459	—56.5
Production, 7 mos., tons	310,802	715,548	—56.6
Steel boilers:			
New orders, 7 mos., no.	4,725	7,761	—39.2
Steel Ingots:			
Production, 7 mos., tons	17,134,668	26,500,839	—35.4
Cement:			
Production, 7 mos., bbl.	74,032,000	92,972,000	—20.4
Shipments, 7 mos., bbl.	73,964,000	90,291,000	—18.1
Stocks, July 31, bbl.	25,957,000	26,289,000	—1.1
Common Brick:			
Stocks, burned, July 1, M.	189,621	390,782	—51.5
Unfilled orders, July 1, M.	49,106	182,680	—73.1
Lumber, Softwoods:			
Production, 7 mos., M. ft.	5,468,272	8,026,864	—32.0
Shipments, 7 mos., M. ft.	5,843,363	7,655,534	—23.6
New orders, 7 mos., M. ft.	5,707,456	7,376,072	—22.6
Unfilled orders, July 31, M. ft.	597,360	712,605	—16.1
Gross stocks, July 31, M. ft.	4,240,753	4,621,617	—8.2
Enameled Sanitary Ware:			
New orders, 7 mos., pcs.	1,138,080	1,516,276	—25.2
Shipments, 7 mos., pcs.	1,222,306	1,524,272	—19.7
Porcelain Plumbing Fixtures:			
Shipments, 7 mos., pcs.	32,046	75,193	—57.5
New orders, 7 mos., pcs.	40,023	84,618	—52.8
Unfilled orders, July 31, pcs.	10,476	34,171	—69.5
Stocks, July 31, pcs.	24,641	34,259	—28.0
Terra Cotta:			
New orders, 7 mos., tons	29,037	50,251	—42.2
Vitreous China Plumbing Fixtures:			
New orders, 7 mos., pcs.	935,533	1,174,231	—20.4
Shipments, 7 mos., pcs.	1,006,219	1,316,730	—23.6
Unfilled orders, July 31, pcs.	188,623	299,269	—37.2
Stocks, July 31, pcs.	554,939	654,535	—15.3

WAGE CHANGES IN EIGHTEEN CITIES

	Carpenters		Bricklayers		Plasterers		Ironworkers		Common Laborers	
	July 15	Sept. 1	July 15	Sept. 1	July 15	Sept. 1	July 15	Sept. 1	July 15	Sept. 1
Athens, Pa.	$0.60@$1.00	$0.50@$0.70	$0.80@$1.00	$1.00@$1.18	$1.00	$1.18	.....	$1.37½	$0.30	$0.30@$0.40
Baltimore, Md.	1.00@1.10	.90@1.00	1.75	1.75	.....	.....	$1.00@$1.25	1.00@1.25	.30	.30
Charleston, W. Va.	.75@1.00	.75@1.00	1.50	1.50	1.00	1.00	.75@1.25	.75@1.25	.30@.35	.30@.35
Cleveland, O.	.75@1.37½	.75@.85	1.25@1.50	.90	1.00@1.12½	.70@1.00	1.00@1.25	.90@1.00	.40@.50	.30@.40
Columbus, O.	.75@.90	.80@1.00	1.25@1.56½	1.25@1.56½	.90@1.10	1.10@1.25	1.00	1.25@1.40	.40@.50	.35@.50
Duluth, Minn.	.90	.90	1.30	1.30	1.30	1.30	1.00@1.25	1.00@1.25	.50@.65	.50@.65
Ft. Worth, Tex.	.....	.65@.75	.....	1.00@1.12½	.....	1.00@1.12½	.....	.40@.75	.25@.30	.20@.25
Galesburg, Ill.	.....	1.12½	.....	1.37½	.....	1.37½	.....	1.25	.....	.55
Indianapolis, Ind.	.98	1.00	1.30	1.30	1.26	1.26	1.16	1.16	.40	.35
Kansas City, Mo.	1.32½	1.37½	1.62½	1.62½	1.62½	1.62½	1.37½	1.37½	.82½	.82½
Knoxville, Tenn.	.40@.50	.40@.50	.50@.60	.50@.60	.50	.50	none	none	.20@.25	.20@.25
Louisville, Ky.	.60@.85	1.00	.80	1.50	.70@.80	1.62½	.50@.85	1.25	.25@.35	.30@.40
Minneapolis, union	.75@.85	.75@.85	1.00@1.10	1.10	1.00@1.25	1.00	.....	.80	.40@.45	.45
Peoria, Ill.	1.20	1.20	1.50	1.50	1.50	1.50	1.25	1.25	.35@.75	.35@.75
St. Louis, Mo.	1.50	1.50	1.75	1.75	1.75	1.75	1.75	1.75	.87½	.87½
Syracuse, N. Y.	.60@1.00	.60@1.00	.60@1.00	.60@1.00	.60	.60@1.00	1.37½	1.37½	.30@.50	.30@.50
Trenton, N. J.	1.25	1.25	1.65	1.55	1.65	1.65	1.75	1.75	.40@.50	.40@.50
Youngstown, O.	1.25	1.25	1.50	1.50	1.50	1.50	1.25	1.25	.75	.75

AVERAGE DELIVERED PRICES

	Sept., 1931	Aug., 1931	Sept., 1930	Per Cent Ch'ge in 1931
Cement, bbl., net	$1.97	$2.00	$2.46	—20.0
Gravel, ton	2.13	2.15	2.35	—9.3
Crushed stone, ton	2.19	2.20	2.48	—11.7
Sand, ton	1.55	1.65	1.94	—20.1
Tile, 4 in., ea	.075	.075	.084	—10.7
Brick, M	12.65	12.92	13.79	—8.3
Lime, hyd. fin., ton	19.23	19.23	21.99	—12.6
Pine, 3x12, M ft	59.73	60.00	62.77	—4.8
Fir, 3x12, M ft	42.40	42.80	47.10	—9.8
Sewer pipe, 12 in., ft	.396	.396	0.50	—20.8
Steel shapes, mill, 100 lb.	1.60	1.60	1.60	.....
Rein. bars, mill, 100 lb.	1.60	1.60	1.70	—5.9
C.-I pipe, 12 in., mill, ton	34.50	35.00	37.25	—7.4
Average decrease	....	....	....	—11.8

Lumber—Stocks of the softwoods are at 4,298,000,000 ft., with orders not yet filled 578,958,000 ft. This is a decrease from a year ago of 10 per cent in stocks and 19 per cent in unfilled orders. Drastic restriction of production will be necessary in all departments of the lumber industry before the end of the year, in order to bring reserve stocks within the amount satisfactory to the United States Timber Conservation Board. Sawed fir, hemlock, spruce, pine or larch (all dutiable) continue to arrive from Canada, Mexico, Germany, Poland, Honduras and Yugoslavia—none from Russia. Among the few declines of the month were a reduction of $2 per thousand feet, to $15, for fir delivered Seattle; $3, to $55, for pine 3x12s at Philadelphia.

Cement—Prices are weak, but official quotations are unchanged from a month ago because of light buying. Demand runs close to 16,000,000 bbl. a month, compared with 20,000,000 last year.

Aggregates—Gravel declined during August 5c. per ton, to $2.50 delivered Baltimore; $20c., to $1.65, Detroit; 15c. per cubic yard, to $1.80, Denver. Crushed stone advanced 5c. per ton, to $2.80 delivered Baltimore.

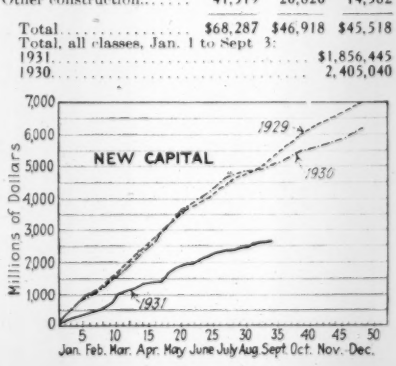
Capital and Contracts

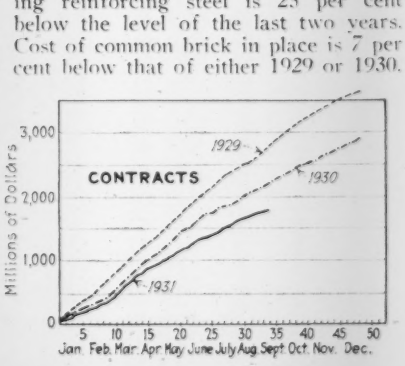
New capital issues of the last week in August totaled 13 millions—7 private and 6 public. Since Aug. 1 the weekly average has been 20 millions, compared with 61 in July and 25 in August, 1930. The principal issues of the week include State of Maine 3½s, $2,000,000, highways and bridges; Milwaukee County, Wis., 4½s, $1,220,000, court house and public buildings; Salt Lake City, Utah, 4s, $700,000, water.

This week's contracts, with comparisons, are as follows:

(In thousands of dollars)

	Sept. 3, 1931	Average of Last Four Weeks 1931	1930
Buildings:			
Industrial	$2,608	$3,187	$4,049
Other	12,971	13,984	15,907
Streets and roads	11,189	8,927	11,179
Other construction	41,519	20,820	14,382
Total	$68,287	$46,918	$45,518
Total, all classes, Jan. 1 to Sept. 3:			
1931			$1,856,445
1930			2,405,040

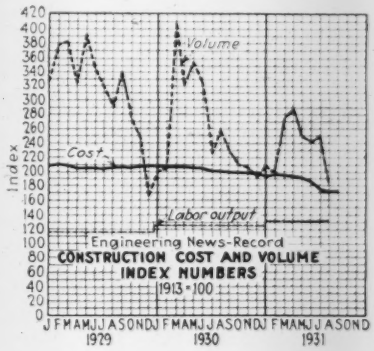




Construction Cost and Volume Index Numbers

The Aug. 1 cost index number has been revised from 168.38 to 171.38. Because of this and the removal of a $25,000,000 project from the July contract total, the volume index for July is 248 instead of 277, as given last month.

The Sept. 1 cost index is 170.40, and the volume index is 187, the lowest since December, 1929.



E. N.-R. Cost		E. N.-R. Volume	
Sept., 1931	**171.40**	**August, 1931**	**187**
August, 1931	171.38	July, 1931	248
September, 1930	199.58	August, 1930	259
1930 (Average)	202.85	1930 (Average)	260
1929 (Average)	207.02	1929 (Average)	317
1913 average	100.00		
1930		1930	
January	208.96	January	199
February	206.46	February	204
March	206.80	March	408
April	207.12	April	320
May	205.86	May	354
June	203.36	June	324
July	200.95	July	226
August	200.95	August	259
September	199.58	September	232
October	198.72	October	211
November	198.54	November	207
December	196.86	December	192
1931		1931	
January	194.48	January	208
February	196.61	February	198
March	194.51	March	278
April	191.63	April	289
May	189.33	May	251
June	187.23	June	243
July	174.37	July	248
August	171.38	August	187
September	171.40		

Construction Costs in Three Western Cities in 1929-31

Costs of highway, building, sewer and water-main construction were given for 33 cities in the issues of July 30 and Aug. 6. Contractors have since furnished costs for work in three other Western cities.

The table gives costs for the city of Seattle, Wash., from the records of a prominent contractor in that city. According to these figures, excavation in the summer of 1931 cost 47 per cent less than in 1929 and 33 per cent less than in 1930; concrete paving was 36 and 26 per cent respectively below these two years; asphalt paving, 36 and 20 per cent below. Another local authority gives excavation costs as 30c. per cubic yard in 1929, 26c. in 1930 and 22c. in 1931. Costs of 9-6½-9-in. concrete paving he gives as $2.75 per square yard in 1929, $1.66 in 1930 and $1.78 in 1931.

The table shows that the cost of placing reinforcing steel is 25 per cent below the level of the last two years. Cost of common brick in place is 7 per cent below that of either 1929 or 1930. This contractor estimates $22 per ton as the cost for erecting structural steel. He estimates the productivity of labor for the three years 1929-31 at 25 per cent more than in the preceding three years. The second local source gives $72 per ton as the cost of steel erected; $32 per 1,000 for common brick in place; $8 for building concrete without forms; 15c. per square foot for floor forms.

A Minneapolis contractor gives excavation costs of 60c. per cubic yard in 1929, 55c. in 1930 and 50c. in 1931. Costs of 7½-in. concrete paving for the three years are, respectively, $2.35, $2.15 and $2. Costs of 10-in. sewer laid 8 ft. deep are $1.30, $1.05 and $1. Costs of 4-in. water main, 7½ ft. cover, are $1.70, $1.60 and $1.50.

The Missouri state highway department furnishes costs of earth excavation and concrete pavement 9-6-9-in. For excavation per cubic yard, 36.7c. in 1929, 35.2c. in 1930 and 32.6c. in 1931, the present level 11 per cent below that of 1929 and 7 per cent below 1930. For concrete pavement, $2.099 in 1929, $2.063 in 1930 and $1.941 in 1931, present level 3 per cent below that of the last two years.

A CONTRACTOR'S COSTS IN SEATTLE

	Summer of 1929	1930	1931
Highway:			
Earth excavation, cu.yd	$0.57	$0.45	$0.30
Concrete, cu.yd., 7 in	13.75	11.80	8.75
Asphalt, sq.yd., 2 in	.75	.60	.48
Building Construction:			
Reinf. steel, placing, per ton	20.00	20.00	15.00
Common brick in place, per M	40.00	40.00	37.00
Concrete fireproofing, per cu.yd	9.00	9.00	8.00
Concrete floor arches per cu.yd. without forms	9.00	9.00	8.00
Concrete in reinf.-conc. buildings, per cu.yd. without forms	13.00	13.00	11.00
Floor forms, sq.ft., including stripping	.15	.15	.12
Comparable Sizes and Depths:			
Sewers			
Vit. tile in place, lin.ft	.85	.75	.60
Concrete in place, lin.ft	.89½	.79½	.63
Water Mains			
Cast iron in place, lin.ft	2.50	2.25	2.00
Steel in place, lin.ft	2.25	2.00	1.75

Current Prices of Construction Materials

Price advances since last month are indicated by **heavy type**; declines by *italics*

Building Materials

PORTLAND CEMENT—Prices per barrel, for cement in cloth, *without including charge for four bags at 10c. each*. Cash discount not deducted. Prices are delivered by truck to contractors at site of job:

	Sept. 3, 1931	One Mo. Ago	One Yr. Ago
Atlanta	$2.15	$2.15	$2.49
Baltimore	1.82	1.82	2.60
Birmingham	2.25	2.40	2.60
Boston	2.20	2.20	2.40
Chicago	1.95	1.95	2.20
Cincinnati	1.60	1.60	2.94
Cleveland	1.25	1.25	2.80
Dallas	1.88	1.88	2.15
Denver	2.40	2.80	2.61
Detroit	2.08	2.08	2.60
Jersey City	1.89	1.89	2.60
Kansas City	2.10	2.10	2.60
Los Angeles	2.10	2.10	1.92
Minneapolis	2.15	2.15	2.50
Montreal	2.18	2.18	2.20
New Orleans	1.95	1.95	2.65
New York	1.85	1.85	2.10
Philadelphia	*1.95*	2.00	2.10
Pittsburgh	1.81	1.81	.....
St. Louis	1.85	1.85	2.45
San Francisco	2.44	2.44	2.64
Seattle	**2.20**	1.70	.....

Current mill-prices per barrel, in carloads, without including charge for four cloth bags, f.o.b.:

Alpena, Mich	$1.20	Limedale, Ind	$1.20
Buffington, Ind	1.10	Mason City, Ia	1.10
Hannibal, Mo	1.10	Norfolk, Va	1.71
Houston, Tex	1.94	Northampton, Pa	1.21
Hudson, N. Y	1.31	North Birmingham, Ala	1.41
Ironton, Ohio	1.06	Richard City, Tenn	1.41
Iola, Kan	1.10	Universal, Pa	1.21
La Salle, Ill	1.10	Wyandotte, Mich	1.20

SAND AND GRAVEL—Per ton, delivered by dealers. Gravel, sizes ¼-in. or 1½-in. Weight of either, 3,000 lb. per cu. yd., unless otherwise specified:

	Gravel	Sand
Atlanta	$3.00	$2.00
Baltimore	*2.50*	*1.60*
Birmingham, per cu.yd., 2,600 lb	*Slag used*	**2.50**
Boston	1.60@1.75	.90@1.15
Chicago, per cu.yd	2.00	2.00
Cincinnati	1.50	1.25
Cleveland, per cu.yd., 3,000 lb	2.60	2.50
Dallas, per cu.yd., 2,750 lb	*2.25*@3.00	*2.25*@2.50
Denver, per cu.yd., 2,700 lb	*1.80*	1.35
Detroit	*1.65*	*1.50*
Kansas City	2.00	2.00
Los Angeles	2.20	1.50@1.70
Minneapolis, per cu.yd., 2,800 lb	1.70@2.40	1.00
Montreal	1.50	1.25
New Orleans, per cu.yd., 2,700 lb	2.95	1.80
New York, per cu.yd.; gravel, 2,800@3,000 lb.; sand, 2,700 lb.	3.15	2.15
Philadelphia	2.35@3.20	1.55@2.40
Pittsburgh	1.55	1.75
St. Louis	*1.65*	1.35
San Francisco	1.75	1.75
Seattle, per cu.yd., 3,200 lb	1.85	1.85

CRUSHED STONE—Per ton, sizes, ¼-in. or 1½-in., limestone, delivered by dealers. Weight, 3,000 lb. per cu.yd., unless otherwise specified:

Atlanta	$3.00
Baltimore	**2.85**
Birmingham	*Slag used*
Boston	1.90@2.00
Chicago, per cu.yd., 2,500 lb	2.00
Cincinnati	2.25
Cleveland	2.60
Dallas, per cu.yd., 2,500 lb	*2.90*@3.25
Denver, granite, per cu.yd., 2,700 lb	2.50
Detroit	*1.95*
Kansas City	2.00
Los Angeles	2.20
Minneapolis, per cu.yd., 2,600 lb	2.40
Montreal	2.00
New York, per cu.yd	3.15
Philadelphia	2.30@3.15
Pittsburgh	3.25
St. Louis	*1.65*
San Francisco, trap rock	1.65
Seattle, per cu.yd., 2,700 lb	3.00

CRUSHED SLAG—Prices for carloads, per net ton, at plant:

	1½-In.	¾-In.	Roofing	Sand
Birmingham, Ala	$0.90	$1.15	$2.05	$0.55
Buffalo District	1.25	1.35	2.25	1.25
Cleveland, Ohio	1.10	1.10	2.25	.70
Western Pennsylvania	1.25	1.25	2.00	1.25
Toledo, Ohio	1.10	1.10	1.10	1.00
Youngstown District	1.25	1.35	2.00	1.25

CONCRETE BLOCKS—Standard, 8x8x16-in., hollow, delivered to job, each:

Birmingham (5x8x12)	$0.084	Kansas City	$0.18
Boston	.16@.20	Minneapolis	.11
Brooklyn and Queens	.12	New Orleans	.20
Cleveland	.16@.17	Philadelphia	.18@.25
Denver	.22	Pittsburgh	.20@**.26**
Detroit	.12	St. Louis	.14

HOLLOW TILE—Building tile per block, delivered by dealers to contractors in lots of 2,000 pieces or over:

	4x12x12	6x12x12	8x12x12	10x12x12	12x12x12
Atlanta	$0.09	$0.12	$0.14	$0.18	$0.24
Baltimore	.105	.175	.20	.....	.26
Birmingham	.089	.122	.167	.219	.25
Boston	.082	.118	.152	.21	.35
Chicago	.068	.0935	.1275	.1647	.183
Cincinnati	.06815	.09485	.129	.165	.184
Cleveland	.048	.066	.09	.117	.13
Dallas	.0885	.1255	.1485	.251	.306
Denver	.0975	.135	.175	.2125	.25
Detroit	.08	.11	.145	.19	.215
Kansas City	.088	.11	.145	.19	.215
Los Angeles	.09425	.134	.188	.2325	.3115
Minneapolis	.0611	.081	.10605	.1302	.1737
New Orleans	.068	.093	.13	.176	.212
New York	.075	.125	.14	.....	.....
Perth Amboy, N. J.(f.o.b.)	.....	.....	.....	.2388	.2956
Philadelphia	.105	.14	.215	.28	.34
Pittsburgh	.041	.058	.0845	.111	.12227
St. Louis	*.07*	*.098*	*.125*	*.17*	*.20*
San Francisco	*.0767*	*.105*	*.1765*	.....	.....
Seattle	.085	.115	.18	.....	.....

BRICK—Prices delivered by dealers per thousand, are as follows:

			Paving F.O.B.	
	Common	Face	3x8¼x4-In	3¼x8¼x4-In.
Atlanta	$13.00	$21.50	$32.00	$37.00
Baltimore	12.50	25.00@35.00	40.00	*43.00*
Birmingham	13.50	22.50	27.00	32.00
Boston	14.00	28.00	42.50	47.00
Chicago	12.00	.....	42.00	45.00
Cincinnati	16.00	24.00	35.00	37.00
Cleveland	12.00@14.00	21.00@28.00	33.00	36.00
Dallas	14.50	17.50	.....	29.50
Denver	9.00@10.00	25.00	.....	.....
Detroit	15.00	25.00	35.50	37.50
Kansas City	14.00	.....	35.00	37.50
Los Angeles	9.00	26.50	.....	.....
Minneapolis	10.50	30.00	.....	.....
Montreal	28.00	.....	.....	.....
New Orleans	13.00	.....	35.00	42.00
New York	*12.50*	26.00	45.00	50.00
Philadelphia	16.00	.....	40.00	45.00
Pittsburgh	*12.90*	22.00	41.00	58.00
St. Louis	14.00	22.00	35.00	35.00
San Francisco	14.00	.....	45.00*	.....
Seattle	14.00	.....	48.50	61.00

*2¼x8¼x4-in.

LIME—Prices delivered by dealers to job:

	Hydrated, per Ton		Lump, per Barrel	
	Finishing	Common	Finishing	Common
Atlanta	$20.00	$12.50	.....	$2.50†
Baltimore	22.00	14.00	.....	2.25†
Birmingham	30.00	17.50	.....	**2.50@3.00†**
Boston	22.00	14.50	$4.00*	3.10*
Chicago	15.00	14.50	15.00‡	15.00‡
Cincinnati	13.05	10.70	.....	.....
Cleveland	12.00	10.00	2.50†	2.50†
Dallas	20.00	.....	2.35†	.....
Denver	30.00	23.75	3.80*	3.00†
Detroit	14.00	12.00	1.75†	1.65*
Kansas City	19.00	18.00	2.25†	2.00†
Los Angeles	26.00	18.00	2.00†	2.00†
Minneapolis	25.50	21.00	.....	1.70†
Montreal	18.00	.....	10.00	.....
New Orleans	25.00	15.00	2.65†	1.95†
New York	18.00	15.50	4.10*	3.15*
Philadelphia	18.00	*14.50*	18.00‡	14.00‡
Pittsburgh	13.50	13.00	4.25*	2.75†
St. Louis	22.00	18.00	.....	15.00‡
San Francisco	20.00	20.00	.....	1.85†
Seattle, paper sacks	35.00	24.00	.....	2.80†

*Per 280-lb. bbl. (net). †Per 180-lb. (net). ‡Per ton.

LIMESTONE—Mill blocks, f.o.b. siding, per cu.ft.:

New York: Rustic buff, $1.42; Standard gray, $1.47; Standard, $1.57; Selected gray, $1.57; Selected buff, $1.67.
Boston: Rustic buff, $1.45; Standard, $1.58; Selected buff, $1.71.
Pittsburgh: Rustic buff, $1.03; Standard, $1.18; Selected buff, $1.28.

SLATE—Roofing, f.o.b. quarry, Bangor, Pa., net, per square;

No. 1 Clear	$9.00@$14.00
No. 1 Ribbon	7.50@10.25
Medium Clear	8.00@10.50

Road and Paving Materials

PAVING STONE—Carload lots of granite blocks, 4x8x4-in., dressed, f.o.b.:

Atlanta	$3.00 per sq.yd.
Baltimore	3.00 per sq.yd.
Boston	135.00 per M.
Chicago, 5 in	3.25@3.90 per sq.yd.
Cincinnati	110.00 per M.
Cleveland	90.00@100.00 per M.
Detroit, 5 in	3.00 per sq.yd.
Kansas City	3.75 per sq.yd.
Minneapolis, 4½ in	2.80 per sq.yd.
Montreal	104.75 per M.
New Orleans	2.80 per sq.yd.
New York, 5 in	120.00 per M.
Philadelphia	125.00 per M.
St. Louis, 5 in	*3.30* per sq.yd

Current Prices of Construction Materials

Road and Paving Materials—Continued

WOOD-BLOCK PAVING—Prices, f.o.b., in carloads:

	Size of Block	Treatment	Per Sq.Yd.
Atlanta	3½	16	$2.25
Boston	3½	16	2.25
Chicago	3½	12	1.80@2.00
Kansas City	3½	16	2.50
Minneapolis	3½	16	2.50
Montreal	3	16	2.63
New Orleans	3½	16	2.30
New York	3½	16	2.00
St. Louis	3½	16	2.10

FLAGGING—Alongside dock, New York, per sq.ft.:
Manhattan and Bronx, 4 ft. wide, $0.24 Queens, 5 ft. wide, $0.26

CURBING—Prices per lin.ft., f.o.b., cutting charges not included:
New York: Bluestone, f.o.b. barge, straight, 5x16-in., rough, 90c.
Birmingham: Granite, straight, 5x16-in., 50c.; 6x20-in., 60c.; roundings, 5x16-in., 65c.; 6x20-in., 80c.
St. Louis: Class "B" straight, 5x16-in., 75c.; roundings, $1.05@$1.30.

ASPHALT—Paving asphalt, f.o.b., per ton. Packages are 350-lb. bbls. or 425-lb. drums, in carload lots:

	Packages	Tank-car or -boat
Atlanta	$18.40	$15.40
Baltimore (f.o.b. refinery)	16.00	12.00
Birmingham (f.o.b. refinery)		16.50
Boston	22.00	17.50
Chicago	22.50	18.30
Cincinnati		12.00
Cleveland	18.75	15.50
Dallas	20.00	
Denver	30.00	
Detroit	16.68	12.43
Kansas City (f.o.b. refinery)	16.00	11.00
Los Angeles (f.o.b. refinery)	18.00	12.00
Maurer, N. J. (Bermudez)		25.00
Maurer, N. J. (Trinidad)		21.00
Minneapolis (f.o.b. Twin Cities)	23.10	18.10
Montreal	17.00	13.00
New Orleans	24.00	21.00
New York (f.o.b. refinery)	16.00	12.00
Philadelphia	16.00	12.00
Pittsburgh	24@26	14@18
St. Louis	21.50	17.50
San Francisco (f.o.b. refinery)	18.00	12.00
Seattle	21.40	18.00

ROAD OILS—Residual, prices, f.o.b., in tank cars, 8,000 gal. minimum, 45% asphalt, per gal.:

New York	$0.035
Birmingham	.06
St. Louis	.03@.04
Dallas	.05

Iron and Steel

PIG IRON—Furnace, per gross ton:

Birmingham, No. 2 fdry., silicon, 1.75@2.25	$12.00
Pittsburgh, basic	16.00

STRUCTURAL STEEL—Prices per 100 lb., delivered from warehouse except in Birmingham and Pittsburgh, where prices are f.o.b. mill, beams and channels, 3 to 15 in; angles 3 to 6-in., ¼-in. thick; tees, 3-in. and larger; and plates, ¼-in. thick and heavier:

Birmingham	$1.75	New York	$2.35
Chicago	2.65	Pittsburgh	1.60
Cleveland	2.95	St. Louis	3.25
Dallas	3.90	San Francisco	2.90

BARS, CONCRETE REINFORCING—Prices per 100 lb., delivered from warehouse except in Birmingham and Pittsburgh, where prices are f.o.b. mill, on bars rolled from billets, size ½-in.:

Birmingham	$1.75	New York	$2.35
Chicago	2.00	Pittsburgh	1.60
Cleveland	1.75	St. Louis	2.50
Dallas	2.50	San Francisco	2.50

EXPANDED METAL LATH—Per 100 sq.yd., painted, delivered to job, in lots under 200 sq.yds:

Lb. per Sq.Yd.	New York	Birmingham	Chicago	St. Louis	Dallas	San Francisco
2.2	$13.00	$17.50	$10.10*	$19.00	$18.00	$21.50
2.5	14.00	18.50	10.90*	20.00	19.50	22.50
3.0	15.50	20.50	12.25*	21.50	.....	25.00
3.4	16.50	22.00	13.10*	22.50	24.00	27.00

*More than 200 sq.yds.

WIRE REINFORCEMENT FOR CONCRETE—Plain, per 100 sq.ft., 4 in. x 4 in. triangle mesh; manufacturers' quotations are in carloads at mills; dealers' are delivered in lots of 10,000 sq.ft. or over:

Style Number	Weight in Pounds per 100 sq.ft.	Pittsburgh Mill	Chicago District Mill	Del. From Warehouse: New York	St. Louis	Dallas	San Francisco
032	22	$0.94	$0.87	$1.32	$1.30	$1.63	$1.22*
049	28	1.20	1.11	1.67	1.70	2.00	1.55*
068	30	1.47	1.35	2.07	2.10	2.25	1.91*
093	45	1.88	1.74	2.65	2.65	2.86	2.46*
126	57	2.33	2.15	3.28	3.30	3.52	3.03*
153	68	2.78	2.56	3.92	3.95	4.20	.....
180	78	3.19	2.95	4.49	4.35	4.80	.....

*F.o.b.

STEEL SHEETS—Prices per 100 lb. for base sizes, delivered from warehouse, except in Pittsburgh, where prices are f.o.b. mill:

	Blue Annealed No. 10*	Black No. 24	Galvanized No. 24
Chicago	$2.85	$3.30	$3.85
Cleveland	3.00	3.60	4.00
New York	2.65	3.50	4.00
Pittsburgh	1.85	1.75@2.25	2.75@2.80
St. Louis	3.45	3.85	4.35
San Francisco	3.65	4.15	4.65

*Light plates.

WIRE ROPE—Discounts from manufacturers' list price on regular grades of bright and galvanized, Eastern Territory, New York, and East of Missouri River:

	Base
Cast steel round strand rope	20%
Galvanized iron rigging and guy rope (add to list)	12½%
Galvanized steel rigging and guy rope	7½%
Plow steel round strand rope	35%
Round strand iron and iron tiller	50%
"Special Steel" and extra strong cast steel, round strand rope	27½%

Discount 5 points less than discount for Eastern territory: California, Oregon, Nevada, Washington, Wyoming, New Mexico, Colorado, North Dakota, Nebraska, Kansas, Oklahoma and Texas. Discount 10 points less than discount for Eastern territory: Arizona, Montana, Idaho and Utah.

RIVETS—Structural rivets, round head, ½-in., full kegs, per 100 lb., delivered from warehouse, except in Pittsburgh, where prices are f.o.b. mill:

Chicago	$4.00
Dallas	5.00
Denver	4.65
New York	4.00
Pittsburgh	2.75
St. Louis	4.15
San Francisco	5.50
Seattle	5.50

STEEL SHEETPILING—Base price, f.o.b., Pittsburgh, for large mill lots, per 100 lb., $1.90

TERNE PLATE—I C, 8-lb. coating, 20x28-in., f.o.b., Pittsburgh mill:
Per package, $10.30

SHIP SPIKES—Per 100 lb., black, from dealers' warehouse stocks; galvanized are about $1.75 per 100 lb. higher:

	½-In.	⅝-In.	¾-In.
San Francisco	$5.50	$5.05	$4.90
Seattle	7.75	5.65	5.50

Pittsburgh mill base in lots of 200 kegs or more, $2.90 per 100 lb.

WIRE NAILS—Per 100 lb. keg, base, delivered from warehouse stocks; also Pittsburgh mill base:

Pittsburgh Mill	Birmingham	Chicago	St. Louis	Dallas	San Francisco	Montreal
$1.95@$2.00	$2.65	$3.30	$2.40	$3.50	$2.75	$4.95

SCRAP—The prices following are, f.o.b., per ton, paid by dealers:

	New York Per Gross Ton	Chicago Per Gross Ton	Detroit Per Gross Ton
No. 1 railroad wrought	$8.25	$8.00@$8.50	$
Stove plate	4.00@4.75	7.50@8.00	4.25
No. 1 machinery cast	7.50	10.50@11.00	8.50*
Machine shop turnings	2.50	3.75@4.25	4.00
Cast borings	2.50	3.75@4.25	5.50
Railroad malleable	7.00	9.50@10.00	
Re-rolling rails	6.25	10.50@11.00	9.00
Misc. steel rails		8.50@9.00	8.00
Heavy melting steel, No. 1	5.00	8.50@9.00	7.00
Iron and steel pipe	6.00	3.50@4.00	

*Net ton.

FREIGHT RATES—The following freight rates per 100 lb., effective May 20, 1930, apply on finished steel products in the Pittsburgh district, including plates, structural shapes, merchant-steel bars, pipe fittings, plain and galvanized wire nails, rivets, spikes, bolts, flat sheets (except planished), chains, etc.:

Atlanta	$0.58*	Detroit	$0.265†
Baltimore	.27†	Kansas City	.695†
Birmingham	.58*	New Orleans	.67*
Boston	.40†	New York	.33†
Buffalo	.235†	Pacific Coast (all rail)	1.15‡
Chicago	.34†	Philadelphia	.29†
Cincinnati	.265†	St. Louis	.39†
Cleveland	.185†	St. Paul	.60*
Denver	1.15‡		

*36,000 lb. †40,000 lb. ‡60,000 lb.

Railway Materials and Supplies

STEEL RAILS—Per gross ton, f.o.b.:

	Pittsburgh	Birmingham	Chicago
Standard openhearth rails	$43.00	$43.00	$43.00
Light rails, 25 to 45 lb.	34.00	34.00	34.00@36.00
Re-rolled rails	24.00@28.00		34.00@36.00

RAILWAY TIES—For fair-sized orders, f.o.b., the following prices per tie hold:

		6 In. x 8 In. by 8 Ft.	7 In. x 9 In. by 8½ Ft.
New York	Long-leaf sap pine, untreated	$1.00	$1.20
	Creosoted—prices on application.		
Birmingham	White oak, untreated	.95	1.10
	White oak, creosoted	1.50	1.60
	Southern pine, untreated	.50	1.00
	Southern pine, creosoted	1.10	1.45
Chicago	White oak, untreated	1.21	1.75
	Oak, empty cell, creosoted	1.61	2.34
	Oak, zinc treated	1.49	2.19
	Southern pine, creosoted	1.38	1.94
St. Louis	White oak, untreated	.85	1.65
	Red oak, untreated	.80	1.50
	Red oak, creosoted	1.15	1.90
San Francisco	Sap pine or cypress, untreated	.70	1.35
	Douglas fir, green, untreated	.51	.73
	Douglas fir, empty cell, creosoted	1.40	1.79
Montreal	Birch or maple, untreated	.75@1.25	.75@1.25
	Birch or maple, creosoted	1.20@1.30	1.50@1.60

Current Prices of Construction Materials

Railway Supplies—Continued

TRACK SUPPLIES—Prices per 100 lb. f.o.b., for large mill lots, at Pittsburgh, Birmingham and Chicago, together with warehouse prices at other places named:

	Pittsburgh	Chicago	Birmingham	St. Louis	San Francisco
Standard spikes, ⅝-in. and larger	$2.70	$2.80	$2.70		$4.10
Track bolts	3.80	3.80	3.70	4.50	5.10
Standard section angle bars, splice bars or fish plates	2.75	2.75	3.00*	.....	.....
Tie plates	1.95	1.95	2.07½	.....	.....

* At warehouse.

Pipe

WROUGHT STEEL PIPE—Discounts from standard lists for delivery from warehouse, except at Pittsburgh, where prices are f.o.b. mill:

	1 to 3-In. Butt Weld		3½ to 6-In. Lap Weld	
	Black	Galvanized	Black	Galvanized
Chicago	57.3%	44.8%	53.9%	41.4%
Cleveland	53.3%	42.3%	50.8%	37.8%
New York	56.14%	43.6%	52.72%	40.18%
Pittsburgh	64%	52.5%	61%	49.5%
St. Louis	51%	38%	48%	35%

CAST-IRON PIPE—Prices per net ton, for bell and spigot pipe, Class B and heavier, f.o.b., on regular lots (250 tons and under) of pipe:

	4-In.	6-In. and Over
Birmingham mill	$38.00@$39.00	$35.00@$36.00
Burlington (N. J.) mill	*36.00@ 37.00*	*33.00@ 34.00*
Chicago	46.00@ 47.00	43.00@ 44.00
New York	*39.00*	*36.00*
Pittsburgh	46.50@ 47.50	43.50@ 44.50
St. Louis	45.00@ 46.00	42.00@ 43.00
San Francisco	48.00@ 49.00	45.00@ 46.00

Gas pipe and Class A, $3.00 per ton extra.

SEWER PIPE—Prices delivered, per foot, for standard pipe; 6, 8 and 12-in. are single strength and 18, 24, 30 and 36-in. are double strength:

	6-In.	8-In.	12-In.	18-In.	24-In.	30-In.	36-In.
Atlanta	$0.105	$0.175	$0.315	.....	.....	.....	.....
Baltimore	.10	.30	.58	.....	$1.93	.....	$6.50
Birmingham	.135	.225	.405	$0.85	1.625	$3.18	4.38
Boston	.18	.28	.55	1.35	2.38	3.95	5.90
Chicago	.18	.28	.54	1.25	2.25	4.75	6.00
Cincinnati	.135	.21	.405	*1.05*	*1.89*	*3.46*	*5.1725*
Cleveland	*.1125*	*.175*	*.3375*	*.825*	*1.485*	4.824	7.38
Dallas	.23	.325	.586	1.106	1.95	3.68	5.00
Denver	.161	.23	.414	.816	1.44	.....	.....
Detroit	.18	.28	.6075	1.50	2.70	5.12	.....
Kansas City	.21	.33	.52	1.22	1.90	3.60	.....
Los Angeles	.217	.2825	.4985	1.1865	2.034	3.93	9.00
Minneapolis	.155	.24	.50	1.15	1.85	3.45	4.60
Montreal	.50	.45	.75	1.95	2.60	.....	7.20
New Orleans	.18	.30	.54	1.02	1.95	.....	.....
New York	.17	.265	.52	1.30	2.34	4.47	6.86
Philadelphia	.0945	.147	.297	.80	1.44	2.304	3.28
Pittsburgh	.1575	.245	.54	1.25	2.25	4.68	7.17
St. Louis	.1295	.235	.423	1.05	1.80	3.20	4.40
San Francisco	.21	.30	.54	1.26	2.16	3.60	5.40
Seattle	.22	.30	.54	1.26	2.16	2.50	5.50

CLAY DRAIN TILE—Prices delivered by dealers, per 1,000 lin.-ft.:

Size, In.	New York	Birm'ham	Pittsburgh	St. Louis	Dallas	San Fran.	Seattle
4	$43.00*	$50.00	$80.00	$50.00	$80.00	$67.50	$60.00
6	78.00*	85.00	110.00	85.00	110.00	112.50	112.00

*F.o.b.

Miscellaneous

LINSEED OIL—Raw oil, f.o.b., in 1- to 4-bbl. lots, per lb.:
New York.... *$0.089* Chicago.... $0.098 Minneapolis... *$0.098*

WHITE AND RED LEAD—Base price per 100-lb. keg, f.o.b., New York: White, dry, $13.25; White, in oil, $13.25; Red, dry, $13.25; Red, in oil, $14.75.

CHEMICALS—Water, sewage treatment, road work, round lots in the New York market:

Sulphate of aluminum, in bags, per 100 lb	*$1.25@$1.40*
Sulphate of copper, in bbl., per 100 lb	*.60@ 3.75*
Soda ash, 58%, in bags, per 100 lb	1.15@1.17½
Chlorine, cylinders, per lb	.04@ .06
Bleaching powder, in drums, f.o.b. works, per 100 lb	2.00@ 2.10
Calcium chloride, flaked, in drums, f.o.b. works, per ton	22.75

MANILA ROPE—The number of feet per pound for the various sizes is as follows: ⅝-in., 7-ft.; ¾-in., 6-ft.; 1-in., 4½-ft.; 1¼-in., 3-ft.; 1½-in., 2-ft.; 2-in., 1½-ft.; 2½-in., 1-ft.; 3-in., ¾-ft. Following prices are quoted by dealers per pound or ½-in. and larger:

Atlanta	$0.25	Kansas City	$0.23
Baltimore	.225	Los Angeles	.175
Birmingham	.25	Minneapolis	.19
Boston	.20	Montreal	.185
Chicago	.17	New Orleans	.22
Cincinnati	.21	New York	.17
Cleveland	.21	Philadelphia	.21
Dallas	.26	St. Louis	.17@.175
Denver	.20	San Francisco	.175
Detroit	.185	Seattle	.175

BUILDING PAPER—Black, 50-lb. per roll of 500 sq.ft., in carloads, f.o.b., producing point $2.16

SLATERS FELT—In carloads, per roll, f.o.b., producing point $0.79

ROOFING MATERIALS—Prices, f.o.b. New York, delivered by dealers to contractors, in carloads:

Asphalt felt, per 100 lb	$2.50
Tar felt, per 100 lb	2.50
Asphalt coating, per gal	.34½
Tar pitch, in 350 lb. barrels, per ton	28.00

PREPARED ROOFINGS—Prices, delivered by dealers to contractors, in carloads, f.o.b. New York, per square:

Single shingles, slate finish, sufficient to cover 100 sq.ft.	$6.50
Strip shingles, 4 in 1, hexagonal shape, with Underwriters' label	6.25
Slate surfaced roofing in rolls weighing 85 to 90 lbs.	2.50

WINDOW GLASS—Discounts from latest jobbers' window-glass list, dated Sept. 15, 1928, at New York warehouse:

	Single Thickness		Double Thickness	
	A Quality	B Quality	A Quality	B Quality
First 3 brackets	89%	91%	88%	90%
Larger sizes	88%	90%	88%	90%

EXPLOSIVES—Price per pound for dynamite delivered in small lots—under 200 lb.:

	Gelatin 40%	Gelatin 60%		Gelatin 40%	Gelatin 60%
Atlanta	$0.22	$0.245	Los Angeles†	$0.1725	$0.1925
Baltimore	.215	.2375	Minneapolis	.20	.225
Birmingham	.135	.1575	Montreal	.20	.24
Boston	.225	.25	New Orleans	.195	.22
Chicago	.195*	.22*	New York	.245‡	.2675†
Cincinnati	.22	.245	Philadelphia	.215	.24
Dallas	.2125	.2475	St. Louis	*.1975*	*.2175*
Denver, f.o.b.	.19	.2125	San Francisco	.155	.18
Kansas City, Mo.	.2025	.2225	Seattle	.1525	.175

*Quantities above 500 lb. but less than a ton. †San Fernando Arsenal. ‡Special gelatin in case lots.

Lumber

Prices Are Per Thousand Feet, Board Measure

New York—Timbers, No. 1 Common, rough, delivered to contractor at site of job, in Manhattan, in 20 ft. lengths and under, per M. ft., b.m.:

	Long-leaf Yellow Pine	Douglas Fir
3x4 to 8x8	$47.50	$30.00
3x10 to 10x10	55.00	31.50
3x12 to 12x12	65.00	32.50
3x14 to 14x14	72.50	35.50

Chicago—Timbers, No. 1 Common, rough, per M. ft. b.m., f.o.b., in carloads For delivery to job from stock, in truckloads, add $10 per M. ft., b.m.:

	20 Ft. and Under Long-Leaf Yellow Pine	Up to 32 Ft. Douglas Fir
3x4 to 8x8	$39.50	$37.50
3x10 to 10x10	47.00	37.50
3x12 to 12x12	58.00	37.50
3x14 to 14x14	71.00	38.50

San Francisco—Douglas fir, No. 1 Common, rough, at yards. For delivery to contractor at site of job, add $5 per M. ft., b.m.:

	10-16-18 and 20 Ft.	22 and 24 Ft.
3x3 and 4	$30.00	$32.00
3x6 and 8	30.00	32.00
3x10 and 12	30.00	32.00
3x14	33.00	34.00

Other Cities—Delivered by dealers, No. 1 Common, rough, per M. ft., b.m.:

	8x8-In. x 20 Ft. and Under				3x12 to 12x12-In. 20 Ft. and Under	
	Pine	Fir	Hemlock	Spruce	Pine	Fir
Atlanta	$50.00	.....	.....	.....	$65.00	.....
Baltimore	36.00	$50.00	$53.50	$61.75	75.00	$50.25
Birmingham	46.00	.....	.....	.....	76.00	.....
Boston	51.00	46.00	47.00	48.75	57.00	43.00
Cincinnati	42.50	55.00	.....	.....	52.50	52.50
Cleveland	54.00	54.00	.....	.....	45.00	49.00
Dallas	55.00	57.50	55.00	55.00	55.00	50.00
Denver	.....	34@50	50.00	.....	.....	49.00
Detroit	53.00	51.00	.....	.....	65.00	51.00
Kansas City	36.00	36.50	36.50	.....	55.00	42.00
Los Angeles	.....	*41.50*	.....	.....	.....	42.50
Minneapolis	.....	46.25	.....	.....	.....	46.25@47.75
Montreal	.....	.....	.....	40.00	40.00	.....
New Orleans	40.00	40.00	.....	45.00	65.00	60.00
Philadelphia	*45.00*	42.00	*36.00*	*40.00*	*55.00*	*40.00*
Pittsburgh	53.00	57.00	65.00	66.00	43@57	57@60
St. Louis	*44.00*	38.00	39.00	.....	56.00	39.00
Seattle	.....	*16.00*	.....	.....	.....	*15.00*

	1x10 In. x 16 Ft. and Under			2x10 In. x 16 Ft. T. & Gr.	
	Pine	Fir	Hemlock	Pine	Fir
Atlanta	$55.00	.....	.....	$37.50	.....
Baltimore	*53.00*	$44.00	$43.75	.....	.....
Birmingham	40.00	.....	.....	55.00	.....
Boston	46.00	41.00	42.00	48.00	$45.00
Cincinnati	45.00	47.50	.....	35.00	45.00
Cleveland	65.00	54.00	.....	42.00	54.00
Dallas	60.00	.....	.....	55.00	.....
Denver	.....	26.00	36.00	.....	45.00
Detroit	49.00	45.00	.....	46.00	45.00
Kansas City	45.00	35.00	35.00	35.00	33.00
Los Angeles	**41.50**	**41.50**	.....	.....	48.50
Minneapolis	65.00*	40.00	.....	45.00*	39.00
Montreal	45.00	50.00	40.00	.....	55.00
New Orleans	40.00	40.00	.....	54.00	58.00
Philadelphia	*48.00*	*40.00*	*35.00*	*49.00*	*40.00*
Pittsburgh	40.00	47.00	55.00	40.00	50.00
St. Louis	39.50	39.00	39.00	**43.00**	41.00
Seattle	.....	*15.00*	.....	.....	16.00

*Northern Pine, No. 2 Com.

PILES—Prices of Nichols Bros., 90 West St., N.Y.C., per lineal foot, pine, with bark on, f.o.b., New York; delivered from barge, 1½ to 2c. per ft. additional:

Dimensions	Points	Length	Barge	Rail
12 in. at butt	6 in.	30 to 50 ft.	$0.12	$0.165
12 in.—2 ft. from butt	6 in.	50 to 59 ft.	.165	.215
12 in.—2 ft. from butt	6 in.	60 to 69 ft.	.19	.235
14 in.—2 ft. from butt	6 in.	50 to 69 ft.	.225	.345
14 in.—2 ft. from butt	6 in.	70 to 79 ft.	.2425	.295
14 in.—2 ft. from butt	5 in.	80 to 85 ft.	.305	.395
14 in.—2 ft. from butt	5 in.	85 to 89 ft.	.345	.435

CONSTRUCTION NEWS

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Some of the Week's Large Projects

For further details turn to the appropriate sections in this issue

Location	*Project*	*Cost*	*Status*
Waterworks			
Memphis	Pumping station	$1,346,719	Contracts
Grade Crossings			
South Bend (Ind.)	Grade separation	1,000,000	Proposed
Federal Government			
Chicago	Post office	15,959,547	Contract
Newark (N. J.)	Post office and courthouse	6,150,000	Proposed
Oswego (N. Y.)	Dredging	1,000,000	Proposed
Factories and Mills			
Bay Point (Calif.)	Factory	1,500,000	Proposed
Buildings			
New York	Apartments	1,000,000	Separate contracts
Baltimore	Hospital	1,750,000	Proposed
St. Louis	Hospital	1,850,000	Contract
Montreal (Que.)	Hospital	1,000,000	Proposed
Ottawa (Ont.)	Public	5,000,000	Proposed
Los Angeles	University	1,000,000	Bids asked
Louisville (Ky.)	Seminary	1,000,000	Proposed
Middlebury (Vt.)	College group	1,500,000	Proposed
Chicago	Exposition	1,000,000	Proposed

WATERWORKS

PROPOSED WORK

Calif., Los Angeles—City Council, 25,000 ft. c.i. mains, 242 service connections in Van Nuys Blvd. and Bradley St. Impvt. Dist. $30,000. J. J. Jessup, city engr.

Ill., Colchester — City Council, 75,000 gal. storage tank, 50,000 gal. concrete clear well, brick pump house, 2 centrifugal pumps, chlorinator. Project postponed indefinitely. W. A. Fuller Co., 2916 Shenandoah Ave., engr. Noted Aug. 14.

Ind., Waukegan—City Council, mains in several streets. $15,800. H. Bleck, Waukegan, engr.

Ky., Louisville—See "Schools."

Md., Baltimore—Bd. Awards, rejected bids Aug. 5, excavation, installing and backfill 48 in. suction main for Ashburton Pumping Station. E. G. Rost, Municipal Bldg., water engr. Noted July 30.

Mass., Plymouth—LeBaron R. Barker pumping plant, 2 flumes at north shore of White Island. $15,000 or more. Private plans.

Mo., Everton—Preliminary plans deep well and pump, tank on tower, distribution system. $20,000. J. D. Alexander, Springfield, engr.

Mo., Houston—New waterworks. C. A. Haskins, 822 Finance Bldg., Kansas City, Mo., engr.

O., Ashland—City, 2 m.g. reservoir to increase local water storage at site of stand pipe which would be discontinued only in case of emergency. Project will proceed in spring. $60,000.

O., Salem—Bd. Control, bids about Oct. 22, developing new water field, sinking new wells, new equipment, in northwest part city. $25,000.

Okla., Haskell—Extending mains, hydrants, valves, boxes. $45,000. Milliken & Whiteneck, Majestic Bldg., Oklahoma City, engrs.

Okla., Hobart—City Council, A. A. Kirby, mayor, new water supply. $450,000. Holway Eng. Co., 15 West 7th St., Tulsa, engrs.

Okla., Oklahoma City—Preliminary plans 5 elevated water tanks for use in waterworks storage system and main extensions. $950,000 bond election soon for same. L. M. Bush, City Hall, engr.

W. Va., Holliday's Cove — Town extending waterworks to southern corporation limits recently annexed to city. $30,000.

Ont., Ancaster—W. R. English, Reeve, soon takes bids waterworks. $50,000.

Ont., Sudbury—City, 14 in. copper main in Marion St., 6 and 8 in. c.i. mains in Laura Ave. and 5 streets. $22,733. Wm. McMullen, Mackie Bldg., engr.

Que., Deschambault — Co-operative to be formed after completion plans waterworks. $60,000. Ricard & Royer, 190 St. Paul St., Quebec, engrs.

Que., Montreal—City Water Bd. installing 3 additional 30 m.g. pumps.

BIDS ASKED

Minn., Ely—Sept. 10, by City Council, A. O. Knutson, city clk., pipe line installation, (1) furnishing pipe line materials for line from city to Burnside Lake, 500 ft. intake pipe, 25,200 ft. discharge pipe (2) furnishing materials, installing (3) furnishing 3 horizontal centrifugal, motor-driven pumps. $200,000. Oliver Iron Mining Co., c/o M. W. Willis, Wolvin Bldg., Duluth, engrs. Noted Aug. 27.

N. Y., New York—Sept. 15, by Bd. Water Supply, 346 Bway., making test borings along line Delaware Aqueduct Tunnel in Carmel, Putnam Co., Somers, North Salem and Bedford, Westchester Co., Contr. 315.

O., Oak Hill—Sept. 19, by Village, complete waterworks, sewerage systems, incl. water distribution system, wells, iron removal plant, supply line, two 75,000 gal. steel reservoirs, sewers, sewage disposal works. H. K. Bell, 727 McClelland Bldg., Lexington, Ky., consult. engr.; adv. E. N.-R. Sept. 3.

CONTRACTS AWARDED

Ark., Little Rock—Arkansas State Military Dpt., Lt. Col. E. Woodford, State House, installing 250 g.p.m. centrifugal pump and 1 m.g. water reservoir at Camp Pike, 6 mi. north of here, to W. F. Moody & Co., A.O.U.W. Bldg.

Calif., Newport Beach—See "Dams."

Calif., Sacramento—City Council, furnishing, driving 1,870 piles, for municipal filtration plant, to Western Foundation Co., 308 West Washington St. Chicago, Ill., at $0.675 per lin.ft.

Calif., Sonoma—Sonoma Water & Irrigation Dist., extending distribution lines, to Stroud Bros., 1500 Union St., Bakersfield, $15,000.

Ind., Valparaiso—City Council, 500,000 gal. storage tank, 3 mi. 10 and 14 in. c.i. pipe, to G. Harrup, South Bend, $89,600. Est. $100,000. Noted Apr. 30.

Kan., LeRoy—Waterworks and distribution system, to Layne-Western Co., 405 East 13th St., Kansas City, Mo. Est. $36,000.

Kan., Turner—J. N. Hearin, pres. Bd. Educ., furnishing, laying 9,500 ft. 8 in. c.i. pipe, fittings, valves, fire hydrants, master meter from 42nd and Argentine Sts., Kansas City, to here, to J. A. Tobin Constr. Co., 226 West 39th St., Kansas City, Mo., $16,679.

Mass., Holyoke—City, standpipe, tanks, pipe line and pump house, to Wm. K. Traquair, 596 South St.

Mass., Medford—Town, digging trenches and laying c.i. pipe, etc., to A. Daddario, 48 Rockdale St., Mattapan, $42,860.

Mass., Southampton — Bd. Water Comrs., Town Hall, 32,700 ft. pipe line, to G. Ferrullo, Inc., 31 Milk St., Boston. Est. exceeds $15,000. Noted Aug. 6.

Mo., St. Clair—City, distribution system, incl. 21,250 ft. 4- to 8-in. c.i. pipe, 37 gate valves and boxes, 47 fire hydrants, 5 cut ins on 4 in. line, 50 ft. 10 in. casing under railroad tracks, ¾ and 1 in. copper pipe, curb stops and corporation stops, to Dunbar-Simon, Inc., 7514 Buckingham Dr., Clayton, $22,835; 500 ft. deep well 10 in. at bottom, previously awarded to Sewell Co., 1627 Locust St., $2,320.

Mo., Waynesville—T. A. Shockley, city clk., distribution system and reservoir, to W. F. Plummer, Inc., Union Natl. Bank Bldg., Springfield, $12,948; 250 ft. well and pump, to Reynolds Drilling Co., Baxter Springs, $3,093. Noted Aug. 12.

Mo., Weston—Waterworks and distribution system, to Layne-Western Co., 507 Mutual Bldg., Kansas City.

Nev., Battle Mountain—For 75,000 gal. tank on 90 ft. tower, to Pittsburgh-Des Moines Steel Co., Rialto Bldg., San Francisco, Calif., $6,790.

N. J., Paterson—Passaic Valley Water Comm., 156 Ellison St., 20,575 ft. 51 in. cylinder rein.-con. pipe, Contr. 8, to Lock Joint Pipe Co., Kenilworth, $369,466; hydraulic turbine generator Ellison St., Contr. 11, to Allis Chalmers Co., 50 Church St., New York, $134,040; pumping equipment, Great Notch, Contr. 13, to Turbine Equipment Co., 30 Church St., New York, $8,870. Grand total $512,376. Noted July 30.

N. Y., Brooklyn—J. J. Dietz, comr. Water Supply, Gas & Electricity, Municipal Bldg., New York, mains in Franklin Ave., to Bronx Water Works Corp., 1 Riverdale Ave., New York, $8,700. Noted Aug. 12.

O., Barberton—Pipe necessary for extending mains into Johnsons Corner Dist., to James B. Clow & Sons, New Cumberstown, $43,918 hydrants, to Darling Valve Mfg. Co., Barberton, $3,739; valves and valve boxes, to Pierce Butler & Pierce Co., 211 South Bway., Akron, $2,339 and $491 respectively. Grand total $50,487.

O., Hudson — Artesian well, new pumping equipment, filtration and water softening plant, to W. B. Kester, 333 North Firestone Blvd., Akron, $41,000.

Tenn., Memphis—Bd. Water Comrs., superstructure for Sheehan Pumping Station at State Normal Teachers' College, to S. & W. Constr. Co., Shrine Bldg., $458,000 substructure, to J. O. Utley, 729 Penobscot Bldg., Detroit, Mich., $577,000 heating, to Hughes Heating Co., 972 Madison St., $8,193 plumbing, to Discher Heating & Plumbing Co., 625 Greenlaw St., $4,875; wiring and switchboard, to Shelby Electric Co., 112 East Iowa St., $25,700; compressor and generator, to Worthington Pump & Mchy. Co., 411 North 7th St., St. Louis, Mo., represented by Memphis Branch of General Electric Co., Exchange Bldg., $65,750 and $50,050 respectively; stokers and fans, to American Eng. Co., Aramingo and Cumberland Sts., Phila., Pa., represented by Hoshall Mchy. Co., Fidelity Bank Bldg., $13,686 pumping units, to Burford, Hall & Smith, Red Rock Bldg., Atlanta, Ga., $50,362; boilers and accessories, to Babcock & Wilcox Co., Traction Bldg., 5th and Walnut Sts., $65,126; coal and ash handling equipment, to Link Belt Co., 910 South Michigan Ave., Chicago, Ill., $27,977. Grand total, $1,346,719. Noted July 16.

Wash., Yakima—Bd. Contr. & Awards, 72,365 ft. 6, 8 and 12 in. water pipe for replacements in waterworks, to Pacific States Cast Iron Pipe Co., Yakima, $52,212.

Wis., Milwaukee—City Council, laying mains in South Robinson Ave., to Mierswa Constr. Co., 2028 West Cherry St., $12,044.

Ont., Hamilton—W. L. McFaul, city engr., superstructure 1 story, 135 x 281 ft., buff press brick filtration plant, to W. H. Yates Constr. Co., 17 Main St. E., $177,000. Noted Aug. 6.

Ont., Ridgeway—Bertie Twp., 9,230 lin.ft. 4, 6 and 8 in. c.i. mains, hydrants, valves, etc., to Damore Bros., 1472 Stanley Ave., Niagara Falls. Est. $15,000.

Que., Louiseville—Town Council, general contract rein.-con., brick addition to filtration plant, to C. E. Deakin, 1440 St. Catherine St. W., Montreal.

See proposal advertising on page 95

Constr. News page 87

LEADITE

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LEADITE has "proven" its true value for more than a quarter century

In fact, as is widely known, LEADITE is the PIONEER self-caulking material for jointing bell and spigot water mains.

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SEWERS

PROPOSED WORK

Ark., Harrison—Soon takes bids sewage disposal plant and sewers in various streets. $60,000. Dickinson & White, Rector Bldg., Little Rock, engrs.

Calif., Los Angeles—Los Angeles Co., 15,500 ft. 27- to 36-in. trunk sewer of which larger sizes will be rein.-con. in Sanitation Dist. 1, Hooper Ave. A. K. Warren, 139 North Bway., engr.

Calif., Los Angeles—Bd. Comrs. Los Angeles Co., 4.73 mi. Unit 4, Belvedere Garden Sewers, Impvt. 757. $66,500. Private plans.

Calif., Los Angeles—City Council 1 mi. 18 in. pipe, County Sanitation Dist. 2, Artesia Trunk Sewer. A. K. Warren, 139 North Bway., engr.

Ind., Kendallville — Sewage disposal plant. $100,000. Address City Clerk.

Ind., South Bend—Bd. P. Wks., intercepting sewers and sewage disposal plant. Project temporarily abandoned. Burns & McDonnell Eng. Co., 406 Interstate Bldg., Kansas City, Mo., engrs. Noted June 19.

Ky., Louisville—See "Schools."

Mass., Saugus — Town, C. E. Flynn, chn. Sewer Comn., sketches sewerage system, $500,000. Fay, Spofford & Thorndike, 44 School St., Boston, engrs.

Missouri—Central Sewer Dist. of St. Louis Co., C. L. Pollard, chn. constructing complete sewerage system to drain approximately 5,600 acres in portions of Clayton, Richmond Heights, Brentwood, McKnight Village, Deer Creek, Roch Hill, Ladue Village and University City, postponed indefinitely due to repeal of Ralph Sewer Law. $4,000,000. Beard Eng. Co., 1330 Big Bend Blvd., Richmond Heights, engrs.

O., Geneva — Village, trunk and sanitary sewer line in East Section. $40,000. P. W. Elwell, 4300 Euclid Ave., Cleveland, engr.

O., Willoughby—Village, 2,500 ft. 15-in. vitr. clay and 2,500 ft. 24-36-in. vitr. tile storm trunk line sewer in Vine St. $25,000. P. W. Elwell, 4300 Euclid Ave., Cleveland, engr.

Okla., Oklahoma City—Preliminary plans new sprinkling filters for sewage disposal plant, $850,000; sanitary sewer extensions in various parts of city, $200,000 bond election soon for same. L. M. Bush, City Hall, engr.

Pa., Coatesville—Sewage disposal plant. Remmington, Vosbury & Goff, 509 Cooper St., Camden, N. J., engrs. G. W. Romel, Jr., boro engr. Noted Apr. 2.

Tex., Dallas — City, c/o E. Goforth, Mill Creek and Dallas branch storm sewers into Trinity River at Levee Dist. To exceed $25,000. W. W. Horner, St. Louis, Mo., consult. engr.

Ont., Hamilton—City, 8 in. and up vitr. tile sewers, manholes, etc., in Brucedale Ave. and East 6th St. $40,256. W. L. McFaul, City Hall, engr.

Ont., Hamilton—City, 8 in. and up vitr. tile sewers in Melville St., from Queensdale Ave to Inverness Ave. $26,625. W. L. McFaul, City Hall, engr.

Sask., Regina — Extending sewage disposal plant, incl. activated sludge plant and large concrete tank. $130,000. D. A. McCannel, city engr.

Sask., Saskatoon—Extending storm sewers, $300,000, new sewage disposal plant, $500,000. G. D. Archibald, city engr.

BIDS ASKED

Ill., Galesburg—Sept. 25, by Bd. Trustees Galesburg Sanitary Dist., completing Cedar Fork Impvt., Contr. D, incl. installing interceptor sewer, bridges, dredging Cedar Fork.

N. J., Princeton—Sept. 15, by Mayor and Council, 68,800 ft. trunk sewers and sewage treatment plant. $850,000. N. S. Hill, Jr., 112 East 19th St., New York, consult. engr. I. R. Riker, Princeton, resident engr. Noted Aug. 27.

N. Y., Ardsley—Village bids about Sept. 10, sewerage system in connection with Saw Mill River Valley Trunk Sewer. Noted July 23.

N. Y., St. George—Sept. 9, by J. A. Lynch, pres. Richmond Boro, Boro Hall, storm water sewer in Bedell Ave., Hylan Blvd. and Fingerboard Rd.

O., Akron—Sept. 8, by A. B. Backherms, sewerage engr., sewers in Linwood and Roscoe Aves., South Main and Dresden Sts.; Sept. 22, sewers in Dan St. Dist. and main trunk sewer in Allenside area, for Pub. Serv. $150,000.

Okla., Pauls Valley — Boys State Training School, c/o State Bd. Affairs, W. C. Hughes, chn., Capitol Bldg., Oklahoma City, 15 x 35 ft. rein.-con. septic tank, miscellaneous sewer connections, to Barbour & Short, 229 West Main St., Norman. $25,624.

Pa., Muncy (Williamsport)—Sept. 10, by P. T. Link, secy. Muncy Boro Council, 6 mi. sanitary sewer mains, incl. manholes, branches. $40,000. M. C. Krause, 428 Pine St., Williamsport, engr.

Tex., Sulphur Springs—Sept. 15, by City, c/o City Secretary, sewage disposal plant. H. L. Thackwell, Jacksonville, consult. engr. J. B. Thomas, mayor.

CONTRACTS AWARDED

Ariz., Phoenix—City Comrs., power house, incl. boilerroom, chlorination room, pump room, switchboard, operators office, main laboratory and superintendents' office, secondary control building, aerator and chlorifiers, and screen house, to Surety Building Corp., 1342 West Roosevelt St. est. $500,000.

Calif., Los Angeles—Los Angeles Co., pumping plant, manholes, 5.42 mi. 5- to 15-in. c.i. and vitr. sewers in Adams St., Artesia Ave., et al, to J. Artukovich, 912 Atlantic Blvd., Hynes, $72,630; rein.-con. viaduct to carry storm drain over Washington Blvd., to Myers Bros., 3407 San Fernando Rd., $19,550. Noted July 30.

Conn., Litchfield — Boro Bd., Town Hall, sewers and sewage treatment plant, to Ossola & Besozzi, 17 Grove St., Torrington, $15,000; and to F. Fabbri, Litchfield, $20,000. Est. $50,000. Noted Aug. 12.

Ill., Sparta—City Council, complete sewage disposal plant, to R. McCalman, Danville, $49,800. Noted May 14.

Ia., Sibley—City Clerk, sewage disposal plant, auxiliary piping, to R. Jensen, St. Cloud, Minn., $24,377. Noted July 30.

Kan., Winfield — State Bd. Administration, State House, Topeka, complete sewage treatment plant with pump house, Imhoff tank, filters, to March Constr. Co., Lawrence. $21,000.

Ky., Louisville—Commissioners of Sewerage, 400 Marion E. Taylor Bldg., Beals Branch Sewer, Sect. B., Contr. 57, 3,620 ft. rein.-con. semi-eliptical sewer of 3 sizes varying from maximum size 10 ft. 3 in. to minimum size 9 ft. to W. S. Rae Co., Oliver Bldg., Pittsburgh, Pa., $150,899. Noted July 30.

Me., Portland — City, Sewer Dpt., sewerage works in Bay St., to C. DiBiase & Co., 22 Monument Sq.; Fall Brook and Rockland Sts., to Monitor Constr. Co., 119 Exchange St. Est. $25,000.

Md., Baltimore—Bd. Awards, sanitary sewers and storm drains in Storm Water Contr. 166, to Nicholas Palmere, 512 South Pobinson St., $30,199.

Mass., Boston—Dpt. P. Wks., sewerage works in Hyde Park and Roxbury, to C. Russo, 499 Beach St., Roslindale, $34,859. Noted Aug. 12.

Mass., Dedham—Town, sewerage works, incl. River Crossing, to J. Morrell, 31 Bucklin St., North Attleboro. Est. $25,000.

Mass., Squantum—State, pumping station, to A. D. Daddario, 15 Agnes Ave., Hyde Park, $37,630.

Neb., Coleridge—D. Mohr, city clk., sanitary sewerage system, incl. 20,215 ft. 8- to 12-in. vitr. sanitary sewer pipe, disposal plant, sewage pumping plant, to Dodson & Humphrey, Omaha, Neb., $33,000. Est. $37,108. Noted Aug. 13.

Neb., Omaha—City, J. P. Hector, clk., 540 ft., 6 ft. 6 in., and 30 ft. 42 in. rein.-con. monolithic sewer, in Willis Ave., between 22nd and 24th Sts., to Busche & Gavenman Constr. Co., Omaha, $19,100; 784 ft. 3- to 10-ft. rein.-con. monolithic sewers in Mud Creek, between 33rd St. and Omaha Belt R.R., A and C Sts., to Beltz Constr. Co., Omaha, $19,444.

N. Y., New York—Dpt. Water Supply, Gas & Electricity, Municipal Bldg., renovating sand filters at sewage disposal plant, Mount Kisco, to F. W. Lewis Co., 253-02 Northern Blvd., Little Neck, $12,340. Noted Aug. 19.

Pa., Phila.—Dpt. P. Wks., Bureau Eng. & Surveys, City Hall Annex, A. Murdock, dir., branch sewers in Devereaux St., from Torresdale to Hegerman Sts., to J. McCool & Co., Land Title Bldg., $1,170; in Foulkrod St., from Tackawanna to Jackson Sts., to T. Lanzelotti, 6626 Landsdowne Ave., $765; Levick St., from Frankford to Battersby Sts., to J. Zecca, 6441 Vine St., $3,997; Mascher St., from Ashdale to Tabor Sts., to Corrado & Froselone, 6045 Magnolia St., $1,178; 16th St., from Lindbergh to Eastwick Sts. and Valley St., from Harrison to Jackson Sts., to T. Lanzelotti, 6626 Landsdowne Ave., $998 and $1,946 respectively; branch sewers in Cresheim Rd., from Allen to Emlen Sts., and in Washington Lane, from Mansfield to Lowber Sts., to E. Ventresco, 6016 Ross St., $14,000 and $14,440 respectively; Oxford Ave., from Comly to Hallerman Sts. and Devereaux St., from Cranford to Oxford Sts., to J. J. McHugh, 1617 Race St., $36,134. Grand total, $74,638.

Pa., Phila.—Dpt. P. Wks., Bureau Eng. & Surveys, A. Murdock, dir., City Hall Annex, Winghocking Storm Sewer, to T. Burke & Co., Widener Bldg., $418,120.

Tenn., Memphis — City Council, 17.5 mi. sewers for Bethel Grove, suburb, to G. J. Robinson Co., Pine Bluff, Ark., $45,083.

Ont., Brampton—Town, two 600 cu.ft. per min. air compressors for new sewage disposal plant, to Babcock-Wilcox and Goldie-McCulloch, Bak of Hamilton Bldg., Toronto, $3,747; sludge pump and motor, digester and clarifiers, to Dorr Co., Inc., 330 Bay St., Toronto, $14,460; piping, valves, etc., to Frances Hankin & Co., 165 Spadina Ave., Toronto, $2,500; diffusor plates, air regulators, to Laurie & Lamb, 21 King St. E., Toronto, $2,488; glass over sludge beds, to King Constr. Co., 40 Dovercourt Rd., Toronto, $2,725. Grand total, $26,920.

WASTE DISPOSAL

PROPOSED WORK

Mass., Lowell—City, T. H. Braden, mayor, incinerator plant, $100,000 or more. Engineer not appointed.

BRIDGES

PROPOSED WORK

Calif., Los Angeles—For 300 ft. rein.-con. girder bridge on San Fernando Rd. at Tunnel Station. $35,000 or more. M. Butler, City Hall, city bridge engr.

Calif., Red Bluff—Bd. Comrs. Tehama Co., steel bridge over Sacramento River, 6 mi. northeast of here. $50,000. W. F. Luning, Red Bluff, co. surv.

Calif., San Jose — City Council, rein.-con. bridge over Guadalupe Creek at San Augustine St., incl. 695 cu.yd. concrete, 258 lin.ft. handrail, 42.47 tons steel, 87 piles (150 yd. concrete), 24,200 sq.ft. forms. W. Popp, city engr.

Calif., Stockton—Bd. Comrs. San Joaquin Co., swing type drawbridge over San Joaquin River at Garwood Ferry, near here. $85,000. J. Monthey, Stockton, co. surv.

Idaho—State Hy. Dpt., Boise, rebuilding 300 ft. bridge over Snake River between Roberts and Birie. $40,000. **Maturity soon.** A. Harbor, hy. comr.

Kan., Kansas City—City Council, H. Payne, clk., widening to 52 ft., 8 ft. concrete sidewalks bridge over Jersey Creek at 7th St. $25,000. C. E. Peterson, City Hall, engr.

Kan., Kansas City—City Council widening to 52 ft. bridge over Jersey Creek 8 ft. concrete on each side. $25,000. C. E. Peterson, city engr.

Kan., Wichita—City, C. C. Ellis, clk., soon takes bids rein.-con. bridge over Little Arkansas River at 13th St. $75,000. P. L. Brockway, City Hall, engr.

Mass., Quincy—New York, New Haven & Hartford R.R., E. E. Oviatt, ch. engr., New Haven, Conn., concrete, steel hy. bridge over railroad, School St. $35,000 or more.

Minn., Grand Rapids—City Council 100 x 40 ft. rein.-con. bridge over Mississippi River, with ornamental lighting system. $25,000.

Okla., Taloga—State Hy. Dpt., Oklahoma City, preliminary plans 9 span 166 ft. rein.-con. trestle bridge, Dewey Co. $32,000. A. R. Losh, hy. engr.

Texas—State Hy. Comn., W. R. Ely, chn., Austin, concrete, steel bridge over Nueces River on Hy. 3, F.A.P. 360-B. G. G. Wickline, Austin, br. engr.

Texas—State Hy. Comn., W. R. Ely, chn., Austin, concrete, steel bridges over Sycamore Creek, Hy. 3, Del Rio, Val Verde Co.—over Concho River, Hy. 4, F.A.P. 590-C, Paint Rock, Concho Co.—overpass across Galveston, Harrisburg & San Antonio Ry. Co., Hy. 128, S.A.P. 840-G, Victoria, Victoria Co. G. G. Wickline, Austin, br. engr.

Texas—State Hy. Comn., W. R. Ely, chn., Austin, concrete, steel overpass across San Antonio & Aransas Pass Ry. on Hy. 16, F.A.P. 34, Wilson Co. G. C. Wickline, Austin, bridge engr.

Tex., Waco—McLennan Co. and State, 502 ft. steel I-beam, concrete overpass across Missouri-Kansas-Texas R.R. tracks, Federal Aid Project 605-B, $50,000. H. C. Porter, Providence Bldg., resident engr.

Que., Caughnawaga—Dpt. P. Wks., Govt. Bldg., Quebec, J. L. Francoeur, minister, soon takes bids bridge over St. Lawrence River.

BIDS ASKED

Calif., San Francisco—Sept. 16, by S. J. Hester, secy. Bd. P. Wks., City Hall, Lincoln Way Viaduct in connection with Sunset Boulevard Project, incl. 22,000 cu.yd. excav., 45 cu.yd. Class A, 2,550 cu.yd. Class B and 185 cu.yd. Class F concrete, 472,000 lb. bar reinforcing steel, 8,000 lb. bronze bearing plate in place, electric work, incl. electroliers, 16,500 sq.ft., 1½ in. asphaltic concrete and 1½ in. binder surfacing. $80,000.

Calif., Santa Cruz—Sept. 8, by H. Miller, clk. Santa Cruz Co., 140 ft. concrete and 120 ft. steel bridges on rein.-con. abutments over San Lorenzo River near Felton Acres.

Illinois—Sept. 8 (extended date) by State Dpt. P. Wks. & Buildings, Div. Hys., Springfield, raising, widening six 14 ft. and one 21 ft. span timber bridge, Route 78, Sect. 109-V-B, Carroll Co.—33 ft. and two 37 ft. span rein.-con. girder bridge, Route 95, Sect. 122-V-B Fulton Co. —one 45 ft., one 50 ft. and two 35 ft. span rein.-con. girder bridge, 2 rein.-con. substructures, 12 ft rein.-con. box culvert, Route 143, Sect. 105-B—one 150 ft. and one 100 ft. span steel superstructures, Route 143, Sect. 105-C, both Saline Co.—rein.-con. substructure, fifteen 43 ft. I-beam approach spans on concrete piles, Route 148, Sect. 120-B—100 ft. steel superstructure, Route 148, Sect. 120-C, both Jefferson Co. —three 50 ft. span rein.-con. substructure, 5 rein.-con. girder approach spans, two 30 ft. span concrete substructure two 30 ft. rein.-con. girder approach spans Route 150 Sect. 133-B —one 115 ft. and one 80 ft. steel superstructures Route 150, Sect. 133-C, both Alexander Co. F. T. Sheets, ch. engr. Noted Aug. 20.

Maryland—Sept. 8, by State Roads Comn., Baltimore, triple span concrete arch bridge over Wills Creek on road from Cumberland to Frostburg, Contr. A-101-67, Allegany Co.—double span steel girder bridge over Fishing Creek, Contr. F-176-57, Frederick Co.—concrete girder bridge over Rock Creek, between Kensington and Rockville Pike, Contr. M-174-37, Montgomery Co.—concrete arch bridge over Northwest Branch, between D. C. line and Avenal, Contr. P-183-37, Prince George Co. H. Williar, Jr., Federal Reserve Bank Bldg., Baltimore, engr.; adv. E. N.-R. Sept. 3.

New Jersey—Sept. 14, by State Hy. Comn., Trenton, 3 rein.-con., concrete ribbed arch span bridge, 75 ft. long, open spandrel superstructure over Weston's Mill Pond, Route S-28, Sect. 1A, city of New Brunswick, Middlesex Co.

N. Y., Buffalo—Sept. 8, by W. G. Hickman, comr. Erie Co., 20 County Hall, steel plate girder bridge over Eighteen Mile Creek, New Oregon-Clarksburg Rd. G. Diehl, Ellicott Sq., engr.

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Bridges (Continued)

Wash., Seattle—Sept. 15, by S. J. Humes, Dir. Hys., Olympia, rein.-con. viaduct and underpass crossing on Aurora Ave., at North 38th St. and retaining walls appurtenant thereto, removing and readjusting watermains, constructing sewers, installing electric conduits, grading, paving, laying sidewalks, constructing concrete railing and all other work in connection with and required to complete north approach Lake Union Bridge on State Rd. 1 between North 36th and North 39th Sts., between Linden and Whitman Aves.

CONTRACTS AWARDED

California—State Hy. Comn., Sacramento, rein.-con. bridge over Bixby Creek, 18 mi. south of Carmel, Monterey Co., to Ward Eng. Co., 315 Montgomery St., San Francisco, $203,334—bridge over fork of Eel River, near Garberville, Humboldt Co. and bridge over Spanish Creek, near Keddie, Plumas Co., to Rocca & Caletti, San Rafael, $86,320 and $92,780 respectively—5 rein.-con. bridges between Tipton and Tulare, Tulare Co., and bridge over North Arm Newport Bay, Orange Co., to J. S. Metzgar & Son, San Gabriel, $43,517 and $65,249 respectively—rein.-con. bridge over Fern Canyon, near La Canada, Los Angeles Co., to Houghton & Anderson, 143 Rose St., Los Angeles, $28,558. Grand total, $519,751.

Indiana and Kentucky — State Hy. Comn., Indianapolis, Ind., Ohio River Bridge from Evansville, Ind., to Henderson, Ky., Contr. 7, Structure 41-A-878, incl. twenty-four 40 ft. spans, solid counter or wall type abutments on bents, rein.-con. deck girder superstructure, rein.-con. bents on timber piles; Structure 41-A-879, one 24 ft. spandrel filled rein.-con. arch bridge on timber piling, incl. 5,958 cu.yd. concrete, 36,340 lin.ft. untreated timber piling, 970,403 lb. reinforcing steel, on U. S. Rd. 41 south of city limits, to Globe Constr. Co., 2307 West Frank St., Evansville, Ind., $134,866. Est. $198,885. Noted July 9.

Louisiana—State Hy. Dpt., Baton Rouge, 2 bridges over Atchafalya River, one at Krotz Springs, St. Landry and Pointe Coupee Parishes, and other at Morgan City, St. Mary Parish, to Foundation Co., 120 Liberty St., New York, $878,239 and $1,028,020 respectively—bridge over Ceminado Bayou, Jefferson Davis Parish, to T. L. James Co., Inc., Ruston, $110,105 overpass over Illinois Central R.R. at Hansen, Jefferson Parish, to B. N. Davis, 1006 Tchoupt St., New Orleans, $80,264—overpass over Rock Island R.R., between Jonesboro and Tannehill, Jackson Parish, to H. A. Worman, Pittsfield, Ill., $19,752. Grand total $2,116,380. Noted July 30.

Maine—State Hy. Dpt., Augusta, Mill Creek and Stroudwater Bridges, both Portland, to J. H. Simonds Co., Portland, $9,700 and $8,041 respectively—bridge in Readfield and Bangor, to Stewart & Williams, Augusta, $4,692 and $6,548 respectively—in Anson, to Jas. Frederick & Co., Pittsfield, $4,545—in Presque Isle, to Boone & Brewer, Presque Isle, $3,524—in Island Falls and Milo, to E. J. Cyr, Waterville, $18,484 and $10,777 respectively—in Sebac, to Wyman & Stimpson, Augusta, $38,554—in Wallagrass, to Madeau & Dumand, Fort Kent, $7,899—superstructure concrete, steel bridge, Rumford and Mexico, to Kittredge Bridge Co., Concord, N. H., $8,893, and substructure to J. H. Kerr, Rumford, $6,419. Grand total, $128,076. Noted July 30.

Maryland—State Roads Comn., G. C. Uhl, chn., Baltimore, altering and extending 2 bridges, Contr. M-169-311, Montgomery Co., to G. B. Mullin Co., 1296 Upshur St., Wash., D. C., $7,355; 3 bridges, Contr. M-170-311, Montgomery Co., to C. H. Matson, Takoma Park, $8,680. Noted July 23 and 30.

Md., Baltimore—Bd. Awards, Loney's Lane Bridge, rein.-con. steel, over Pennsylvania R.R., to Mullan Contr. Co., 3945 Greenmount Ave., $157,940. Noted July 23.

Md., Baltimore—Bd. Awards Warwick Ave. Bridge, from Franklin to Lexington Sts., and Garrison Ave. Bridge, between Fairmount and Edmondson Aves., both over Pennsylvania, R.R. tracks, to Catalano & Pecora, Eldorado Apartments, $147,512. Noted July 30.

Mass., Quincy—New York, New Haven & Hartford R.R. Co., New Haven, Conn., E. E. Oviatt, ch. engr., 2 bridges, concrete subway, grading and surfacing School and Saville Sts., to Tredennick Billins Co., 10 High St., Boston. Est. $25,000 or more. Noted Aug. 20 and 27.

Mo., St. Louis—Bd. P. Serv., City Hall, 150 ft. rein.-con. bridge, 56 ft. roadway, two 12 ft. sidewalks over Maline Creek on Riverview Dr., to G. G. Prendergast Chemical Bldg., St. Louis, $67,948. Est. $98,560. Noted July 16.

Nebraska—Dpt. P. Wks., State House, Lincoln, concrete bridge on Columbus-David City Rd., Platte, Polk and Butler Counties, to Gilmore Constr. Co., 507 Sunderland Bldg., Omaha, $83,871—willow mattress on same road, to L. C. Skkol, Duncan, $10,311—culverts on 6 mi. Project 279-K Nance Co., to Nebraska Culvert Co., Wahoo, $2,799—2 in. gravel surfacing 5.5 mi. Wheeler Co., to Western Bridge & Constr. Co., 3867 Leavenworth St., Omaha, $7,315—1.5 mi. Valley Co., to L. G. Crownover, Holly Apts. 3-A, Lincoln, $1,105. Grand total $105,401.

N. J., Keansburg—Bd. Freeholders Monmouth Co., Court House, Freehold, reconstructing steel, concrete bridge over Wackaach Creek, Laurel Ave., to S. S. Thompson Co., Vanderburg Rd., Red Bank. Est. $25,000.

N. J., South Plainfield—Bd. Freeholders Middlesex Co., Court House, New Brunswick, rein.-con., steel bridge over Bound Brook, South Clinton Ave., to John F. McGovern & Son, 344 George St., New Brunswick. Est. $25,000. Noted July 30.

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New Jersey and Pennsylvania—Joint Bridge Comn. for Elimination of Toll Bridges over Delaware River, State Office Bldg., Trenton, steel, concrete bridge over Delaware River, between Belvidere, N. J., and Riverton, Pa., to F. H. Clement & Co., Wilbur Trust Bldg., Bethlehem, Pa. Est. $25,000.

New York—A. W. Brandt, comr. Hys., Albany, 30 ft. concrete beam bridge and bituminous macadam and gravel approach reconstruction Delaware Co., to H. J. Mack, Buffalo, $5,552 e.e., $7,663; triple 180 ft. trusses, 16 ft. concrete slab bridge, bituminous macadam (penetration method) approach reconstruction Schoharie Co., to Spooner Bridge Constr. Corp., 488 Bway., Albany, $118,321 e.e. $168,753. Noted July 16.

Ohio—O. W. Merrell, dir. Hys., Columbus, removing old bridge and erecting new concrete span bridge, Sect. "A-1" Bowling Green-Napoleon Rd., Wood Co., to Fritz, Rumer Cooke Co., 209 South High St., Columbus, $7,678—extending concrete slab bridge Sect. "D" Sandusky Clyde Rd., Sandusky Co., and steel I-beam bridge, Sect. "L" Hillsboro-Piket Rd., Pike Co., to Carl Huth, Tiffin, $2,489 and $16,915 respectively — Sect. "G" Barberton-Greenwich Rd., Medina Co., concrete bridge, Sect. "A" Chillicothe-Lancaster Rd., Pickaway Co., to A. V. Williams, Martins Ferry, $7,221 and $4,233 respectively — Sect. "C" Urbana-Lison Rd., Clark Co., to Clawon & Moyer, Sydney, $5,373. Grand total $43,909. Rejected bids concrete slab bridge, Sect. "H-1" Columbus-Washington C. H. Rd., Franklin Co.

Okla., Elmer—State Hy. Dpt., Oklahoma City, A. R. Losh, ch. engr. and State Hy. Dpt., Texas, Austin, G. Gilchrist, ch. engr., 1,800 ft. 92 span pile trestle beams on pile trestle piers, Jackson Co., to W. S. Crawford, 4123 Avondale St., Dallas, Tex., $122,501. Est. $130,000.

Okla., Tulsa—City Comrs., E. Logan, aud., 400 ft. concrete viaduct over 3rd St. and Missouri, Kansas & Topeka R.R., to H. L. Cannady Constr. Co., 1112 South Lewis St., $58,013. Est. $100,000. Noted Aug. 14.

Pennsylvania — State Hy. Dpt., Harrisburg, two 62 ft. span through plate girder bridge, 30 ft. roadway, approaches, incl. 180,423 lb. fabricated steel, Route 656, Bucks Co., to J. Maguire, Mahoney City, $22,741; two 45 ft. span rein.-con. bridge, Route 220, Monroe Co., to J. Stem, Stroudsburg, $11,291. Noted July 30, under "Streets and Roads."

South Dakota—State Hy. Comn., Pierre, to Dowd Bros., Clark, bridge near Plankton, Aurora Co. $1,105—to F. I. Cummins Constr. Co. Sioux Falls, bridge on U. S. Hy. 16, McCook Co., $10,104—to Willis Bonesteel, Wagner, bridge State Hy. 52, Fall River Co. $8,664; bridge near Storla, Aurora Co. $3,901 bridge near Teton Stanley Co. $10,523. Grand total $34,287.

Wisconsin—State Hy. Comn., Unemployment Comn. and Hy. Com. of various Counties, Evansville Overhead Approaches, Rock Co., to A. E. Bounsall, Kenosha, $13,763 — Mining Grade Separation, Washburn Co., to Carl and J. Theiler, Tomahawk, $14,121—Powers Overhead Approaches, Dodge Co., to F. Mashuda, Milwaukee, $20,297—grading overhead approaches, Green Co., to Whitewater Bridge Co., Whitewater, $9,416 — Monroe Overhead Approaches, Green Co., to J. O. Legreid, Stoughton, $38,618. Grand total $96,215.

Ont., Galt—J. McCartney, city clk., 2 span 250 ft. rein.-con. bridge over Grand River, on Main St., to W. H. Yates Constr. Co., 17 East Main St., Hamilton, $44,845. Noted Aug. 13.

Quebec—Dpt. P. Wks., Govt. Bldgs., Quebec, general contract 5 span 1,932 ft. concrete, steel bridge over St. Francis River, between St. Francis du Lac and Pierreville, to Kendall Bros., 248 McCord St., Montreal, $233,466; structural steel, to Canadian Vickers, Ltd., Maisonneuve, Montreal, $122,980. Noted Apr. 9.

STREETS AND ROADS

BIDS ASKED

California — Sept. 16, by State Hy. Comn., Sacramento, grading, asphaltic concrete and concrete paving 4.3 mi. road between Fullerton and west boundary line, Orange Co.; untreated crushed gravel or stone surfacing 8.9 mi. road between Redwood Creek and Willow Creek, Humboldt Co. C. H. Purcell, hy. engr.

Calif., Glendale—Sept. 10, by City Council, concrete surfacing 530,000 sq.ft. Glendale Blvd.

Calif., Pomona — City Council bids about Sept. 25, 6 in. concrete paving 190,000 sq.ft. Fulton Rd.

Calif., Richmond—Sept. 8, by A. C. Faris, city clk., grading, curbing, sidewalks, 2 in. asphaltic concrete on 8 in. concrete paving 145,000 sq.ft. Hall Ave. and 14th St.

Calif., Riverside—Sept. 8, by Bd. Comrs. Riverside Co., grading, corrugated metal culverts, 6 in. California road mix surfacing 1,020,000 sq.ft. Co. Impvt. 7. $90,000.

Calif., San Francisco — Sept. 16, by S. J. Hester, secy. Bd. P. Wks., City Hall, curbing, sidewalks, concrete and asphaltic concrete paving Alemany Blvd., Sect. B. $25,000.

Calif., San Francisco—See "Bridges."

Colo., Holyoke—City Council soon takes bids paving in business district. $30,000. A. A. Weiland Eng. Co., 1st Natl. Bank Bldg., Pueblo, engrs.

Connecticut — Sept. 8, by J. A. Macdonald, state Hy. Comr., Hartford, trap rock water-bound macadam paving 8,230 ft. hy. Windsor—surface treated gravel surfacing 18,467 ft. Burlington—gravel surfacing 10,200 ft. Cornwall—17,100 ft. Eastford — 19,100 ft. Hampton — 19,334 ft. Monroe—13,500 ft. Pomfret—grave and waterbound macadam paving 12,887 ft Prospect—crushed gravel surfacing 38,873 ft Woodbury—loose gravel surfacing 19,804 ft Ellington; adv. E. N.-R. Sept. 3.

Conn., Bloomfield—Sept. 5, by Town, H. K Goodwin, clerk, improving streets, 3,100 cu.yd excav., 2,750 sq.yd. 7 in. and 2,400 sq.yd. 5 in water bound macadam paving 5,150 sq.y bituminous surfacing, 850 ft. 12 in. vitr. drai and 4 catch basins. $25,000.

Illinois—Sept. 8 (extended date) by State Dpt. P. Wks. & Buildings, Div. Hys., Springfield —2.4 mi. Route 127, Sect. 103, Dist. 8, Montgomery Co.—3.53 mi. Route 150, Sect. 134—3.38 mi. Route 150, Sect. 135, both Dist. 9 Alexander Co.—7.86 mi. Route 104, Sect 121-A, Dist. 6, Brown Co.—7.95 mi Route 104 Sect. 122-A, Dist. 6, Brown and Pike Counties—3.02 mi. Route 143, Sect. 105-A, Dist. 9, Saline Co.—10.66 mi. Route 148, Sect. 120-A, Dist. 7 Jefferson Co.—2.32 mi. Route 150, Sect. 133-A Dist. 9, Alexander Co. F. T. Sheets, ch. engr Noted Aug. 20.

Ill., Edwardsville—Sept. 5, by Bd. Comrs Madison Co., concrete surfacing 1.0366 mi. Sect 48-15D, 18 ft. G. H. Baker, c/o State Dpt. P Wks. & Buildings, Div. Hys., Springfield, engr.

Ill., Marshall—Sept. 5, by Bd. Comrs. Clark Co., traffic bound gravel or stone surfacing 3.1038 mi. Sect. R-M.F.T. G. H. Baker c/o State Dpt. P. Wks. & Buildings, Div. Hys. Springfield, engrs.

Ill., Murphysboro—Sept. 16, by Bd. Comrs. Jackson Co., gravel or stone surfacing 1.644 mi. Sects. 1X and 1G, M.F.T. 16 ft. G. H. Baker, c/o State Dpt. P. Wks. & Buildings, Div. Hys., Springfield, engr.

Ind., Bluffton—Sept. 7, by Bd. Comrs. Wells Co., stone surfacing 5,280 ft., H. V. Gorshorn Rd. $27,415. P. Scott, Bluffton, co. aud.

Ind., New Albany—Sept. 19, by Bd. Comrs. Floyd Co., improving 20,192 ft. Old Corydon Rd. $32,410. C. F. Finch, New Albany, aud.

Ind., Princeton—Sept. 8, by Bd. Comrs. Gibson Co., concrete surfacing Hugo Schumacher Rd. $24,699; William Martin Rd. $14,225. S. G. Marshall, Princeton, co. aud.

Ind., Princeton—Sept. 8, by Bd. Comrs. Gibson Co., Kentucky rock asphalt surfacing Thomas Nash Rd. $27,095. S. G. Marshall, Princeton, co. aud.

Ind., South Bend—Sept. 8, by Bd. Comrs. St. Joseph Co., concrete surfacing Logan Woodward Rd. and Fir Rd., Penn. Twp., $28,500; Bert Dittman Rd. and Lehman Rd. Greene Twp., $28,000. F. P. Creowe, South Bend, co. aud.

Ia., Independence—Sept. 8, by C. D. Raffaut, aud. Buchanan Co., gravel surfacing 25 mi. trunk and local roads. C. E. Fox, Court House, engr.

Ia., Sigourney — Sept. 9, at office Auditor Keokuk Co., secondary grading local roads in Jackson Twp. and Trunk Rd. N. incl. 67,437 cu.yd. earth, 1,000 cu.yd. loose rock, 4,000 cu.yd. solid rock excav., 16,527 sta.yd. overhaul, placing, filling 1,000 lin.ft. culvert pipe, also furnishing 2,348 lin.ft. corrugated metal culverts. Address County Engineer or Auditor.

Kentucky—Sept. 9, by State Hy. Dpt., Frankfort, grading, drainage structures 6.9 mi. Bardwell-Columbus Rd., Carlisle Co.; 9.7 mi. Covington-Morning View Rd., Kenton Co. B. Johnson, chn.

La., New Orleans—Sept. 10 (extended date) by City Council, various types wearing surface on concrete paving 6,719 ft. St. Roch Ave. from Gentilly Rd. to Dreaux Ave.—2,646 ft. North Robertson St. from Lofitte to Esplanade Ave. $30,000—4,210 ft. Taylor St. from Clara to Broad Sts. $60,000—3,258 ft. Art St. from Gentilly Rd. to Dreaux Ave. $30,000—3,269 ft. Music St. from Gentilly Rd. to Dreaux Ave. $40,000—3,645 ft. Painters St. from Gentilly Rd. to Dreaux Ave.—sidewalks, sub-surface drains, concrete paving 1,106 ft. Solomon St. from Boudin St. to Tulane Ave. $25,000—1,857 ft. Henry Clay Ave. from Prytania St. to St. Charles Ave. $40,000 — 1,644 ft. Henry Clay Ave. from Magazine to Prytania Sts. $35,000—685 ft. Saratoga St. from St. Louis to St. Peters Sts., 301 ft. Monroe St. from Apricot to Pritchard Sts. and 692 ft. Broad Pl. from Loverline to Bway. $35,000—1,852 ft. Reynes St. from Charters St. to St. Claude Ave. $36,000 — 1,400 ft. Dreaux Ave. from St. Rock to Franklin Sts. $28,000—sidewalks, sub-surface drains, various types paving 1,529 ft. Fairmont Dr. from Montpelier St. to Gentilly Rd. $31,000—1,852 ft. Lizardi St. from Charters St. to St. Claude Ave. $37,000—400 ft. Conti St. from North Peters St. to Dock Board Rd., 400 ft. Bienville St. from North Peters St. to Dock Board Rd., 651 ft. Apricot St. from Joliet to Monroe Sts. and 300 ft. Arabella St. from Garfield to Hurst Sts. $34,000—sidewalks, sub-surface drains, manholes, handholes, cleanouts, 6,719 ft. St. Rock Ave. from Gentilly Rd. to Dreaux Ave. — 3,645 ft. Panters St. from Gentilly Rd. to Dreaux Ave. $35,000—3,269 ft. Music St. from Gentilly Rd. to Dreaux Ave. $32,000 — 2,647 ft. North Roberts St. from Lofitte St. to Esplanade Ave. $25,000—4,210 ft. Taylor Ave. from Clara to Broad Sts. $40,000—3,248 ft. Arts St. from Gentilly Rd. to Dreaux Ave. $28,000. Noted Aug. 20.

Maryland—Sept. 8, by State Roads Comn. Baltimore, concrete paving 1.5 mi. Contr. Ce-117-22, Cecil Co.—gravel paving 2.53 mi. Contr. Sm-86-82, St. Marys Co.—macadam paving 6.14 mi. and substructure for bridge over Deer Creek, Contr. H-124-44, Harford Co.—concrete shoulders on 1.64 mi. Contr. M-172-311, Montgomery Co. H. Williar, Jr., Federal Reserve Bank Bldg., Baltimore, engr.; adv. E. N.-R. Sept. 3.

Massachusetts — Sept. 8, by Dpt. P. Wks., A. W. Dean, engr., State House, Boston, bituminous macadam paving 4,600 ft. hy. Sutton—

Streets and Roads (Continued)

4,700 ft. Sunderland — 4,500 ft. Medway — 6,250 ft. Amherst—rein.-con. paving 4,808 ft. hy. Hingham—mixed in place, gravel and tar surfacing 9,500 ft. Ashburnham.

Massachusetts—Sept. 10, by Comrs. Middlesex Co., Court House, East Cambridge, constructing roads, grading, walks in and about hospital grounds between Trapelo Rd., Woburn and Bow Sts., Lexington and Waltham. $25,000 or more.

Massachusetts — Sept. 15, by Dpt. P. Wks., A. W. Dean, engr., State House, Boston, rein.-con. paving 11,223 ft. hy., 2 span through plate girder bridge, canal, 3 span and one span deck plate girder bridges, Millbury and Worcester.

Minnesota—Sept. 15, by State Hy. Dpt., St. Paul, constructing portable and monolithic culverts, grading 99,000 cu.yd. State Projects 30-22, 30-27, 30-29 and 8-52.—183,000 cu.yd. State Projects 34-21 and 34-22—360,000 cu.yd. State Project 47-21, Sect. 2—770,000 cu.yd. State Project 58-21—347,000 cu.yd. State Project 59-27, Sept. 2.

Minn., Duluth—Sept. 9, by S. B. Shepard, engr., St. Louis Co., Court House, grading, ditching, concrete paving 1.88 mi. County Rd. 54, et al., $50,000; grading, graveling Proctor Rd., et al. $66,000.

Mississippi—Sept. 8, by State Hy. Comn., Tower Bldg., Jackson, **(F.A.P. means Federal Aid Project)** hydraulic settlement of fills F.A.P. 117 and F.A.P. 210-A Lauderdale Co.—F.A.P.1 Itawba Co.—F.A.P.40, Lowndes and Monroe Counties—F.A.P. 70-C and 207-B Jones Co.—F.A.P. 82-C Hinds and Copiah Counties—F.A.P. 83-D Copiah Co.—F.A.P. 201-C, Warren Co.—F.A.P. 215-A Lee Co.—F.A.P. 13 Madison Co.—F.A.P. 55 Panola Co.—F.A.P. 70-D and 73-D Forrest Co.—F.A.P. 73-E Stone Co.—F.A.P. 80-A Copiah Co.—F.A.P. 116 Pearl River Co.—F.A.P. 162, 200-B and 200-D Rankin Co.—F.A.P. 184-F Warren Co.—F.A.P. 200-C and 200-F Covington Co.—F.A.P. 200-E Simpson Co.—F.A.P. 209-A Grenada Co.—F.A.P. 216-A Adams Co. C. R. Williams, dir.

Mo., Thayer—F. Crenshaw, city clk., grading, curbing, concrete paving 1st St., from Chestnut to Race Sts., and from Race St., to point 1,430 ft. northwest—2nd St., from Market to Walnut Sts.—Chestnut St., from 1st to 3rd Sts., and from 3rd to 6th Sts., $60,000. Project postponed indefinitely. W. A. Fuller Co., 2916 Shenandoah Ave., St. Louis, engrs.

Montana — Sept. 9, by State Hy. Comn., Helena, **(F.A.P. means Federal Aid Project)** gravel surfacing 12.267 mi. Kalispell-Belton Rd., F. A. P. 257-A and B. Units 2 and 3, Flathead Co.—12.891 mi. Glendive-Sidney Rd., F. A. P. 245-C, Unit 3, Dawson Co.—19.282 mi. Gilford-Chester Rd., F. A. P. 132-B and C, Unit 2, Liberty and Hill Co.—24.319 mi. Jordan-Miles City Rd., F. A. P. 157, B and C, Unit 3, Garfield Co.—8.725 mi. Butte-Boulder Rd., F. A. P. 242-C Unit 4, Jefferson Co.—concrete surfacing 0.42 mi. Nine Mile Rd., F. A. P. 207-A and B, Silver Bow Co.—clearing, grubbing, grading, drainage structures 6.566 mi. Helena-Boulder Rd., F. A. P. 178-D, Unit 1, Jefferson Co.—grading, drainage structures, snow fence 20.378 mi. Miles City-Broadus Rd., F. A. P. 156-C Unit 1, Custer and Powder River Counties—9.636 mi. Big Timber-Reed Point-Columbus Rd., F. A. P. 123-C, 127-E and 133, Unit 1, Sweet Grass and Stillwater Counties—grading, drainage structures, gravel surfacing 10.103 mi. Glacier Park Trail, F. A. P. 95-B, Hill Co. — 12.919 mi. Vaughn-Conrad Rd., F. A. P. 211-B, Teton and Cascade Counties—9 treated timber pile trestles total twenty-eight 19 ft. panels, on Miles City-Broadus Rd., F. A. P. 156-C, Unit 2, Custer and Powder River Counties—2 span 67 ft., 1 span 29 ft. and 3 spans 95 ft. concrete bridges, Big Timber-Columbus Rd., F. A. P. 127-E and 133, Unit, 2 Sweet Grass Co.—4 span concrete bridge over Armells Creek, approaches, Hysham-Forsyth Rd., F. A. P. 114-A, Rosebed Co. R. D. Rader, engr.

New Hampshire — Sept. 10, by State Hy. Dpt., Concord, 6 in. one course rein.-con. on 3 in. gravel paving 57,358 sq.yd. Daniel Webster Hy., Nashua, Hillsboro Co. $153,000. W. N. Prescott, Concord, engr.

New Jersey—Sept. 14, by State Hy. Comn., Trenton, grading, improving shoulders, rein.-con. paving 32,000 sq.yd. Route S-28, Sect. 2, Tanner's Corner-Rue's Lane, Middlesex Co.; 2,850 sq.yd. old Route 6 (1917), Connection to Park Ave. in Deptford Twp. and city of Woodbury, Gloucester Co.

N. J., Dover—Sept. 16, by Bd. Freeholders, Morris Co., Court House, Morristown, rein.-con. paving 12,500 sq.yd. Prospect St., W. H. Hosking, clk.; adv. E. N.-R. Sept. 3.

N. J., Middletown—Sept. 10, by Middletown Twp. Comr., gravel surface—bituminous treated surfacing 20,744 sq.yd. Swimming River Rd., in Atlantic, Shrewsbury and Middletown Twps., Monmouth Co. Allen & Randolph, 60 Broad St., Red Bank, civil engrs.; adv. E. N.-R. Sept. 3.

N. J., Morristown—Sept. 16, by Bd. Freeholders Morris Co., Court House, grading, bridging, 9 in. rein.-con. paving 75,320 sq.yd. Route 10, Sect. 3, Whippany to Route 5 (1917); adv. E. N.-R. Sept. 3.

N. J., Neptune City—Sept. 16, by Boro Council, rein.-con. paving 10,084 sq.yd. Sylvania Ave. Allen & Randolph, 60 Broad St., Red Bank, civil engrs.; adv. E. N.-R. Sept. 3.

N. J., Shrewsbury—Sept. 9, by Bd. Freeholders Monmouth Co., Court House, Freehold, type C concrete paving 29,558 sq.yd. Asbury Ave. Rd. 36, Sect. 3. $25,000 or more. G. K. Allen, Jr., 60 Broad St., Red Bank, engr.

New York—Sept. 8, by A. W. Brandt, comr. Hys., Albany, concrete reconstructing 1.33 mi. Contr. 2214 Rensselaer Co.—6 mi. Contr. 2221, Washington Co.—1.3 mi. Contr. 2212, Onondaga Co.—1.73 mi. Contr. 2213, Yates Co.—11.4 mi. Contr. 2218, Franklin Co.—3.58 mi. Contr. 2217, Nassau Co.—bridging, bituminous macadam M.M. type 4 or 5, concrete approaches 0.61 mi. Contr. 2220, Saratoga and Warren Counties—concrete paving 6.11 mi. Contr. 1923, Cayuga Co.—grading, structures reconstructing 7.87 mi. Contr. 2219, Monroe Co.—grading, structures, concrete paving 6.33 mi. Contr. 1898, Rockland Co.—grading, structures 1.99 mi. Contr. 1925, Westchester Co.—reconstructing slope protection, Contr. 2215, Nassau Co.

N. Y., Brentwood—Sept. 19, by Commissioner Mental Hygiene, State Office Bldg., Albany, construction roads at Pilgrim State Hospital. $182,-305.

N. Y., Long Island City — Sept. 8, by G. U. Harvey, pres. Queens Boro, Queens Subway Bldg., grading, curbing, sidewalks, sheet asphalt on concrete paving Rockaway Blvd., 39th and Myrtle Aves., 83rd, 80th 127th, 148th, 100th Sts.—grading, curbing, flagging, granite block on concrete paving 39th Ave.—grading, curbing, recurbing, sidewalks, 200th St.—grading, ditch drains Horace Harding Blvd.

Oklahoma—Sept. 15, by State Hy. Dpt., Oklahoma City, concrete slab surfacing 5 mi. State Hy. 18 south of Meeker, $80,000—5.51 mi. State Hy. 18 south of Meeker, $80,000—5.51 mi. State Hy. 18 north of Shawnee, $90,000, both Pottawatomie Co.—4 mi. State Hy. 48 south of Seminole $45,000—4 mi. State Hy. 48 north of Seminole, $45,000, both Seminole Co.—5 mi. U. S. Hy. 64 west of Weber Falls $80,000—5 mi. U. S. Hy. 64, east of Warner, $80,000, both Muskogee Co.—3 mi. State Hy. 11 west of Tonkawa, $60,000—4 mi. State Hy. 11 east of Ponca City, $75,000, both Kay Co. All above roads 20 ft. wide. A. R. Losh, hy. engr.

Pa., Houston—Sept. 11, by J. C. Gantz, boro secy., grading, curbing, rein.-con. paving 8,000 sq.yd., brick on sand and cement cushion paving 1,450 sq.yd., bituminous surfacing 5,600 sq.yd. Pike St., from East to West Boro line. H. M. Day, East Pike and Greenside St., Cannonsburg, engr.

Pa., Phila.—Sept. 8, by Bureau Hys., Dpt. P. Wks., City Hall Annex, A. Murdock, dir., Schedule A, grading Fanshawe St., from Oxford to Summerdale Sts., Kerper St., from Oxford to Pennway Sts., Penway St., from Magee to Knorr Sts., Whitaker St., from Magee to Kerper Sts., Hutchinson St., from Nedro to Champlost Sts., Longshore St., from Castor to Loretto Sts.—Schedule B, asphalt paving (assessment work) Annsbury St., from G to H Sts., Penhurst and Shelbourne Sts., from Annsbury to Wyoming Sts., B St. (excluding portions under bridge) from Venango to Erie Sts., Balfour St., from Victoria to Pacific Sts., Pacific St., from Bath to Balfour Sts., Mascher St., from Duncannon to Tabor Sts., Upsal St., from Stenton to Rodney Sts., and Greenway St., from Salford to 59th Sts.—Schedule C, asphalt repaving 9th St., from Susquehanna to Huntington Sts., and 36th St., from Grays Ferry to Reed St.—Schedule D, country road improving Meade St., from Shawnee to Navajo Sts.—Schedule E, ready mixed concrete —Schedule F, repairing bridge over Pennypack Creek on Pine Rd.

Pa., Pittsburgh—Sept. 8, by R. G. Woodside, controller Allegheny Co., 1½ in. limestone rock on 8 in. concrete paving 1st Ave., 30 ft., Breckenridge Boro, $62,000—Class C rein.-con. paving Union Ave., Oakdale Boro and Class C concrete paving curve elimination Pitcairn Rd., Patton Twp., $26,100—440 ft. concrete retaining wall, 544 ft. concrete parapets, 2,700 sq.ft. concrete sidewalks, 7 ft. 10 in. brick on concrete paving 2,700 sq.yd. Carothers Ave., Scott Twp., $36,000. E. A. Griffith, County Bldg., engr.

Pa., Pittsburgh—Sept. 11, by R. G. Woodside, controller Allegheny Co., brick on 8 in. concrete paving 802 ft. Evergreen Ave., 36 ft., in Millvale, $30,000—grading, brick on 8 in. concrete paving 2,626 ft. Cedar Blvd., 27 ft., Mt. Lebanon, $62,000—grading, rein.-con. paving 4,740 ft. Middletown, Coraopolis and Forest Grove Rds., Kennedy Twp., in McKees Rocks, $62,000—17,270 ft. Clever Rd., Kennedy and Robinson Twps., 20 ft., in McKees Rocks, $261,000. E. A. Griffith, County Bldg., engr.

Va., Norfolk—City Council taking bids removing street car tracks, paving 5 mi. Greenway Court, Onley Rd., Redgate, York, Charlotte and Cove Sts., Colley, Euclid, Boissevian and Parker Aves. To exceed $100,000.

Washington—Sept. 1, by S. J. Humes, dir. Hys. Olympia, clearing, grading, drainage structures 11.2 mi. Ellensburg-Roza Rd., Inland Empire Hy., Kittitas Co.; 3.5 mi. Spokane-Whitworth Rd., Inland Empire Hy., and 4.6 mi. junction with Inland Empire Hy. to Peone Creek, Pend Oreille Hy., both Spokane Co.

Wash., Kelso—Sept. 10, by Bd. Comrs. Cowlitz Co., permanent construction 5.1 mi. West Side Permanent Hy. Project 17. $55,000. F. C. Cramer, Kelso, engr.

Wash., Seattle—Bd. Comrs. King Co. bids early next spring constructing 2.75 mi. West Snoqualmie Rd. T. D. Hunt, Seattle, engr.

W. Va., Moundsville—Sept. 14, at office L. L. Stidgers, city clk., 7 in. rein.-con. paving 7th St. from Parriott to Henrietta Sts.—Center St. from Cedar to Elm Sts.—black tops, Triaco, amiesite black rock, Kentucky rock, Kentucky rock asphalt or sheet asphalt resurfacing 5th St. from Jefferson to Tomlinson Aves.—Tomlinson Ave. from 5th to 7th Sts.—6th St. from Tomlinson to Lafayette Aves.—Lafayette Ave. from 6th to 10th Sts.—10th St. from Lafayette to Jefferson Aves.—3rd St. from Jefferson to Cedar Aves. Address City Engineer, City Bldg.

W. Va., Spencer—Sept. 10, by State Road Comn., and Roanoke Co. Court, grading, drainage structures 2.6 mi. Newton-Clay Co. Line Rd., Project 2416-D. G. E. White, secy.

Wisconsin—Sept. 8, by State Hy. Comn. and Hy. Com., Walworth Co. Court House, Elkhorn, grading, bridging, concrete surfacing 30,463 sq. yd. Walworth Rd., S.T.H. 36, State Aid Project 2009, incl. 9,550 lb. reinforcing and 22,230 lb. structural steel.

Ont., Hamilton—See "Contracts Awarded."

Ont., Willowdale—See "Contracts Awarded."

CONTRACTS AWARDED

Ala., Birmingham—Bitulithic paving 22nd St., from 8th Ave. to 12th Aves., to Dunn Constr. Co., Lincoln Life Bldg., $30,708, concrete paving 42nd Pl., from 2nd Ave. to Georgia Rd., to A. J. Honeycutt Co., Martin Bldg., $5,222.

Arizona—State Hy. Dpt., Phoenix, subgrade stabilizer surfacing with mineral aggregate and oil processing 17 mi. Casa Grande-Pisacho Hy., Pinal Co., to N. G. Hill & Co., Phoenix, $54,-245; oil processing, incl. rock surfacing 14.5 mi. from west and city pavement to city limits, Winslow Co., to Lewis Bros., Winslow, $8,822.

California—State Hy. Comn., Sacramento, untreated crushed gravel or stone and surface material stockpiled on 9.3 mi. road between Diddy Hill and Montgomery Creek, Shasta Co., to Hemstreet & Bell, Marysville, $81,465; grading, concrete paving 7.6 mi. road between Tipton Crossing and Tulare, Tulare Co., to Union Paving Co., Call Bldg., San Francisco, $274,283. Noted July 23.

Calif., Menlo Park—City Council, curbing, sidewalks, grading, emulsified asphalt on 4 in. waterbound rock surfacing Arbor Rd., et al. to C. W. Wood, P. O. Box 1435, Stockton, $32,272. Noted Aug. 6.

Calif., Palo Alto—E. L. Beach, city clk., grading, curbing, guttering, sidewalks, 6 in. concrete paving Amherst St., Channing St., et al. to O. V. Freeman, 135 Churchill St., $14,508.

Calif., San Mateo—City Council, 41,000 sq.ft. grading, curbing, sidewalks, 6 in. asphaltic concrete paving B St., to S. M. McGraw, 425 Lexington Ave., Stockton, $48,360.

Calif., Sierra Madre—City Council grading, curbing, guttering, storm drains, 3 in. asphaltic concrete paving 125,000 sq.ft. Woodland Dr., et al., to Heuser & Bingham, 816 Allen Ave., Glendale, $35,971. Noted July 9.

Colorado — State Hy. Dpt., Denver, grading, drainage structures, gravel surfacing 8.664 mi. Rio Grande Co., to Mountain States Constr. Co., Central Blk., Pueblo, $102,199—10.319 mi. Park Co., to J. H. Miller & Co., Denver, $133,-381—concrete paving 4.801 mi. Prowers Co., to Pueblo Bridge & Constr. Co., 710 East 8th St., Pueblo, $130,691. Grand total $366,271. Noted July 23.

Connecticut—J. A. Macdonald, state hy. comr., Hartford, to Barbara & D'Aurio Co., 51 Leavenworth St., Waterbury, crushed stone or gravel surface treating 25,350 ft. hy. Wilton, $12,635; gravel surfacing 7,600 ft. Westbrook, $8,937; 17,420 ft. Somers, $6,234—to Suzio Constr. Co., State and Brooks Sts., Meriden, 12,300 ft. Columbia, $9,693, 7,500 ft. Hebron, $8,366; 13,-500 ft. Scotland, $7,309 crushed stone or gravel surfacing 32,380 ft. Ridgefield, $28,336—to O. W. Beard, 135 Beechwood Ave., Bridgeport, gravel surfacing 18,675 ft. Shelton, $11,724—to Innes Bros., Inc., Echo Lake Rd., Watertown, 22,900 ft. Kent, $15,355—to A. D. Bridges Sons, Inc., Hazardville, 21,120 ft. Enfield, $4,582—to F. D. Miller, Norwich, 11,900 ft. Canterbury, $11,088—to Lane Constr. Co., 37 Colony St., Meriden, trap rock waterbound macadam paving 6,854 ft. Windsor Locks, $8,004—to New Haven Trap Rock Co., 67 Church St., New Haven, trap rock (furnished and spread) 4,800 ft. Madison, $9,120—to W. J. Montgomery Co., Inc., 66 Anderson St., New Haven, bituminous macadam paving 4,347 ft. Darien, $14,956—to J. T. Shiney, West End St., Branford, grading, gravel surfacing 7,000 ft. Clinton, $8,689—to Town of Windsor, Street Department, Windsor, grading 8,448 ft. Tarrifville Rd., Windsor, $4,413.- Grand total, $169,-441. Noted July 23.

Delaware—State Hy. Dpt., Dover, grading, concrete curbing, concrete paving 1,230 cu.yd. Dorman St., Harrington, Contr. 199, to W. Roach & Sons, Georgetown, $15,272—grading, concrete paving 1,050 cu.yd. Laws and Cedar Sts., Bridgeville, Contr. 200, to Highway Eng. & Constr. Co., Selbyville, $11,642—525 cu.yd. School St., Millsboro, Contr. 202, to Old Line Constr. Co., Chestertown, Md., $6,185.—dredging 50,000 cu.yd. material, Indian River Inlet, Contr. 1 (N-4), to Hannaman & Burroughs, Salisbury, Md., $13,000. Grand total, $46,099. Noted July 30.

Idaho—Commissioner P. Wks., Boise, grading, gravel surfacing 13.2 mi. Genesee-Thorn Creek Section of North and South Hy., to General Constr. Co., Colman Bldg., Seattle, Wash., $24,-760. Est. $32,800.

Ill., Carlisle—Clinton Co., grading, concrete paving 2.09 mi. State Route 12, Sect. 2-15d, M.F.T., 9 ft., to Stocker Gravel & Constr. Co., Highland, $25,500. Noted Aug. 13.

Ill., Edwardsville—Madison Co., grading, bridging, concrete surfacing 14,633 ft. Sect. 53-M.F.T. on State Route 14, 18 ft. with 6 ft. shoulders, to McCarthy Constr. Co., Kahl Bldg., Davenport, Ia., $75,515. Est. $93,693 plus cement to be furnished. Noted Aug. 14.

Ia., Waterloo—City Council, curbing, guttering, cut-backs, compacted concrete paving 12,-710 sq.yd., to C. W. Shirey, Waterloo, $31,335.

Kansas—State Hy. Comn., Court House, Erie, to Cook & Cone, Ottawa, oil and aggregate surfacing 20.323 mi. roads in Greenwood Co. $28,022—to Thormartin & Reis, Ft. Scott, 12.011 mi. Labette Co. $11,467; 13.323 mi. Cherokee Co., aggregate $5,176, oil $6,090; 2.246 mi. Montgomery Co., retread $10,229—to G. Ross, Kansas City, Mo., 3.425 mi. Crawford

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Streets and Roads (Continued)

Co. aggregate $2,026, oil $2,066; 2.312 mi. Labette Co. aggregated $1,367, oil $1,210; 25.584 mi. Neosho Co. $28,860. Grand total $90,513.

Kansas — State Hy. Comn., Court House, Laken, **(P. means Project, K.P. Kansas Project, and F.A.P. Federal Air Project)**, to D. H. Hardman, Alton, surfacing 1.122 mi. P. 21.1, F.A.P. 365-A Clark Co., aggregate $702, manip. $590, oil $900; 8.309 mi. same road, Sect. B, aggregate $5,205, manip. $4,390, oil $19,800—to San Ore Constr. Co., McPherson, mineral aggregate surfacing 8.017 mi. Seward Co., $3,413; 6.03 mi. P. 83-5, K.P. 1209, $3,693; 6 mi. P. 45-4, K.P. 1210, $3,675, both Haskell Co.—to Cook & Cone, Attawa, oil surfacing same roads $5,226, $3,915 and $3,883 respectively—to Western Bridge & Constr. Co., 3807 Leavenworth St., Omaha, Neb., aggregate surfacing 9.424 mi. Ford Co. $2,970; 4 mi. Gray Co. $878; 15.302 mi. P. 50-3, K.P. 1212, $3,420; 10.369 mi. P. 50-4, K.P. 1213, $3,800, both Kearney Co.—to Cook & Cone, Ottawa, oil surfacing same roads $5,274, $2,221, $8,924 and $6,052 respectively. Grand total $88,931.

Maryland — State Roads Comn., Baltimore, G. C. Uhl, chn., concrete shoulders on 6.95 mi. M-171-311, Montgomery Co., to G. & L. Contg. Co., Maple Ave., Overlea, Baltimore, $74,133. Noted Aug. 6.

La., Alexandria—City Council, to B. J. Carbo, Alexandria, concrete paving 3rd St. from end of brick paving to city limits $8,136; also 4,450 sq.yd. Murray St. and 3,900 sq.yd. Washington St. at $2.12 per sq.yd.

Maryland—State Roads Comn., G. C. Uhl, chn., Baltimore, concrete paving 0.99 mi. Contr. Ch-107-84, Charles Co. to Pembroke & Gasparovic, Park Hall, $5,980. Noted July 23.

Maryland—State Roads Comn., Baltimore, G. C. Uhl, chn., concrete paving 1.84 mi. H-130-42, Harford Co., to P. Reddington & Sons, 2 East Lexington St., Baltimore, $44,-206. Noted Aug. 6.

Maryland—State Roads Comn., Baltimore, concrete paving 7.87 mi. and concrete shoulders on 0.81 mi. Contr. Wi-79 and S-33-13, Wicomico and Somerset Counties, to Roberts Paving Co., Salisbury, $147,098. Noted July 30.

Maryland—State Roads Comn., Baltimore, graveling 2 mi. Contr. G-44-84, Garrett Co., to Jarboe & Haughton, Mechanicsville, $30,841; concrete paving 1.3 mi. Contr. H-128-42, B-209-42, Harford Co., to Harry T. Campbell & Sons, Towson, $46,512.

Maryland—State Roads Comn., G. C. Uhl, chn., Baltimore, graveling 1.3 mi. Contr. C-53-82, Calvert Co., to Boatwright, Russell & Linton, Manassas, Va., $10,756. Noted July 23.

Md., Baltimore—Bd. Awards, concrete paving 9,600 sq.yd. streets listed in Contr. 600, to Philip E. Rawlings, 2400 Aisquith St., $19,171; sheet asphalt paving 9,200 sq.yd. streets listed in Contr. 601, to P. Flanigan & Sons, Harford Rd. and Baltimore & Ohio R.R., $36,795.

Md., Baltimore—Bd. Awards, concrete paving 9,600 sq.yd. streets listed in Contr. 598, to Arundel Contg. Co., 910 Trinity St., $25,082. Noted Aug. 20.

Md., Baltimore—Bd. Awards, sheet asphalt paving 7,800 sq.yd. streets in Contr. 603, to American Paving & Contg. Co., Menlo Dr. and Western Maryland R.R., $34,459; concrete paving 13,650 sq.yd. streets listed in Contr. 602, to Mahoney Bros., 1111 Rutland Ave., $25,269. Noted Aug. 12.

Md., Baltimore—Bd. Awards, concrete paving 10,830 sq.yd. alleys in Alley Contr. 116, to Arundel Contg. Co., 910 Trinity St., $15,520.

Massachusetts—Metropolitan Dist. Water Supply Comn., 20 Somerset St., Boston, grading, stone walls and driveways, Barre and West Boylston, to A. Ross & Son, 97 Bedford St., Lexington. Est. $25,000. Noted Aug. 6.

Massachusetts—Metropolitan Dist. Comn., 20 Somerset St., Boston, constructing Monantum Rd. in Newton and Watertown, to T. J. McCue, 264 North Beacon St., Watertown, $19,989.

Mass., Boston—Dpt. P. Wks., sheet asphalt paving Webster St., Ward 1, to A. Singarella, 22A Tremlett St., Dorchester, $30,955. Noted Aug. 13.

Mass., Boston — Dpt. P. Wks., State House, J. A. Rourke, comr., sheet asphalt paving, sewerage works in Sanborn Ave., etc., Ward 20, to Appel & O'Toole, 78 Mooreland St., Roxbury, $34,350.

Mass., Boston—Dpt. P. Wks., sheet asphalt paving Franklin Hill Ave., Hyde Park, to M. DeMatteo, 55 Stella Rd., Roslindale, $19,737. Est $25,000. Noted Aug. 13.

Mass., Boston—Dpt. P. Wks., sheet asphalt paving Butler St., Dorchester, to M. E. Gaddis, 6 Beacon St., $30,314; sheet asphalt paving and sewerage work in Charles St., to Coleman Bros., Inc., 245 State St., $168,715. Noted Aug. 13.

Mass., Brighton—Dpt. P. Wks., Boston, J. A. Rourke, comr., artificial stone sidewalks, to Keystone Eng. & Constr. Co., 43 Charter St. Est $25,000.

Mass., Revere—Town, bituminous macadam paving Campbell Ave., to A. G. Tomasello & Son, 250 Stuart St., Boston. Est. $60,000.

Michigan—State Hy. Dpt., Lansing, to Maintenance Division, Lansing, gravel resurfacing M-27-28, C.I. Gogebic Co., $25,000—bituminous retread paving 4.6 mi. M042-2C-3, Keewenaw Co., $27,261—graveling 6.3 mi. M066-15 C.I. Ontonagon Co., $40,000. Grand total $92,261.

Minnesota—State Hy. Dpt., Minneapolis, to Nolan Bros., 18 North 2nd St., Minneapolis,

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paving 59,000 sq.yd. S. P. 9-28 $55,723, 37,000 sq.yd. State Projects 3 and 57-21, $76,538; grading 783,000 cu.yd. S. P. 7-27, Sect. 4, $323,082—to R. P. England, Hastings, 20,000 cu.yd. S. P. 5-42 $32,256; 291,000 cu.yd. S. P. 16-27, $48,978, 338,000 cu.yd. S. P. 16-29, $53,144—to J. J. and M. S. Mergens, 425 Gateway Bank Bldg., Minneapolis, 473,000 cu.yd. S. P. 9-24, $98,492—to Studer & Manion, Excelsior, 236,000 cu.yd. S. P. 12-32, Sects. 1 and 2, and S. P. 6-51, Sect. 2, $54,255—to C. L. Aarvig, Howard Lake, 179,000 cu.yd. S. P. 28-32, Sect. 1, $32,090—to W. W. Magee, 116 West 6th St., St. Paul, 124,500 cu.yd. swamp fill, S. P. 2-40 $38,106—to S. J. Anderson, Warren, 124,204 cu.yd. S. P. 8-51, 8-42 and 8-39, Div. A, $31,097. Grand total $841,761. Noted Aug. 6.

Minn., St. Paul—Paving Johnson Parkway between 7th St. and Stillwater Ave., also installing sewers, to Thornton Bros. Co., 1343 Dayton Ave., $43,500.

Mo., Clayton—St. Louis Co., Court House, grading, rein.-con. paving each side tracks Lockwood Ave., to C. M. Berry Constr. Co., 2732 Sutton Ave., Maplewood, $14,986—grading, macadam paving Destrehan Rd., to Bangert Bros. Constr. Co., Ferguson., $10,102—concrete slab paving Woodlawn Ave., to Kunze Constr. Co., 5926 Scanlon Ave., St. Louis, $3,848; macadam paving Madison Ferry Rd., to Independent Quarry & Constr. Co., 3650 Choteau Ave., St. Louis, $2,962. Grand total $31,898.

Mo., Clayton—St. Louis Co. Court, concrete slab surfacing 11,914 ft. Merrimac Station Rd., and 6,235 ft. Vandover Rd., 20 ft., to A. A. Davis, Inc., Clayton, $74,369 and $81,005 respectively; 1,218 ft. Spencer Pl. 27 ft., to Edward Fehlig & Co., Inc., 14 South Central Ave., $9,243. Grand total $164,617.

Mo., Fulton—Grading, curbing, concrete paving various, to Davis Constr. Co., Boonville, $26,000.

Mo., Lebanon—Curbing, guttering, penetration asphalt paving 60,000 sq.yd., to Garrett Constr. Co., Springfield. $50,000.

Mo., Lee Summit—Concrete paving 49,000 sq.yd., to W. A. Ross Constr. Co., 25th and Summit Sts., Kansas City, Mo., $93,000. Noted July 30.

Mo., St. Louis—Bd. P. Serv., City Hall, concrete slab paving 9,800 sq.yd. Halls Ferry Rd., to Skrainka Constr. Co., Security Bldg., $18,071—grading, drainage structures, concrete slab paving 11,680 sq.yd. Riverview St., to Carlon Constr. Co., 3516 Greenwood Ave., $24,173—vibrolithic concrete paving 2,065 sq.yd. 10th St., to Alfred Lewald, Inc., 5473 Delmar Blvd., $11,727—asphaltic concrete paving 1,700 sq.yd. Penrose St., to Asphalt Paving Co., 1328 Sublette Ave., $11,482. Grand total $65,453. Concrete slab paving 7,200 sq.yd. Chippawa St., to Creech Constr. Co., 4150 Bingham Ave. Noted Aug. 20.

Mo., St. Louis—Bd. P. Wks., City Hall, concrete curb moulded in place, manholes, inlets, sewer revision, 40 ft. concrete paving laid in two 20 ft. sections, 33,905 sq.yd. Riverview St. and curbing, concrete paving 27,795 sq.yd. same street, to Alfred Lewald, Inc., 5473 Delmar Blvd., $67,076 and $49,440 respectively — asphalt paving 30,280 sq.yd. Kingshighway, N. W., to Trinidad Asphalt Mfg. Co., 600 South Theresa Ave., $159,153 — 2,875 sq.yd. Park Lane, to Asphalt Paving Co., 1328 Sublette Ave., $13,205—warrenite bitulithic on concrete paving 1,885 sq.yd. 11th St., to Granite Bituminous Paving Co., Railway Exch. Bldg., $12,780. Grand total $301,654. Noted Aug. 12.

Nebraska — State Dpt. P. Wks., Lincoln **(F.A.P. means Federal Aid Project)**, to Steele & Olinger, Sidney, grading, drainage structures 6.8 mi. F.A.P. 296 B Keith Co., $24,399—to L. L. Sobel, Duncan, F.A.P. 115-B $10,311—to G. W. Condon Co., 223 Grain Exch. Bldg., Omaha, 14 mi. F.A.P. 293 A Red Willow Co., $35,515—to Roberts Constr. Co., 404-5 1st Natl. Bank Bldg., Lincoln, 5.4 mi. F.A.P. 317-D, Cherry Co., $28,408—to A. C. Ross, Bayard, 4.5 mi. F.A.P. 80-L, Grant Co., $9,988—to Yant Constr. Co., 905 Omaha Natl. Bank Bldg., Omaha, 8.5 mi. F.A.P. 317-B, $35,-546, 5.4 mi. F.A.P. 317-E, $51,220, both Cherry Co., to F. L. Busche, 4118 North 30th St., Omaha, 8 mi. F.A.P. 313D Holt Co., $34,976—to A. Einung, Nebraska City, sand gravel surfacing 3.7 mi. F.A.P. 94-C Keith Co., $3,511—to G. E. Smith, 525 South 13th St., Lincoln, concrete surfacing 6.8 mi. F.A.P. 296-B Keith Co., $16,237—to Diamond Eng. Co., Grand Island, grading, drainage structures, bridges, culverts 2.9 mi. F.A.P. 317-A Brown Co., $45,108—bridges F.A.P. 317-B, $8,397, 5.4 mi. F.A.P. 317-D, $1,872, 5.4 mi. F.A.P. 317-E, $1,158, all foregoing Cherry Co.; concrete culverts F.A.P. 293-A Red Willow Co., $11,235—to Gilmore Constr. Co., 507 Sunderland Bldg., Omaha, eighteen 60 ft. spans deck girder bridge approach fill and protection work F.A.P. 115-B, $83,870—to Western Bridge & Constr. Co., 3867 Leavenworth St., Omaha, bridges, culverts on 8 mi. F.A.P. 313-D Holt Co., $5,312—to Koehler Constr. Co., Sterling, 2.9 mi. F.A.P. 317-A Brown Co., $22,259—to F. L. Carswell, Grand Island, pipe for 2.9 mi. road, F.A.P. 317-A Brown Co., $48; 8.5 mi. F.A.P. 317-B, $657, 5.4 mi. F.A.P. 317-D, $534; 5.4 mi. F.A.P. 317-E, $332, all Cherry Co.; 8 mi. F.A.P. 313-D Holt Co., $46; F.A.P. 296-B Keith Co., $995—to Superior Supply Co., Omaha, pipe for 4.5 mi. F.A.P. 80-L Grant Co., $141—to Nebraska Culvert Mfg. Co., Wahoo, pipe for F.A.P. 293-A Red Willow Co., $2,442—Grand total, $434,517. Rejected bids grading, oiled sand surfacing 10.9 mi. F.A.P. 313-E, Wheeler Co., will readvertise. R. L. Cochran, ch. engr.

Nebraska—See "Bridges."

Neb., Crete—City Council, grading, 6 in. sand gravel compacted concrete paving State Paving Dists. 26 and 27, to Allied Contractors, Inc., 1803 Douglas St., Omaha, $30,796 and $24,657 respectively.

Neb., Lincoln—Lancaster Co., gravel surfacing Projects 25, 26, 28, 29, 30, 35, 37, 39 and 40, to Abel Constr. Co., 308-11 Terminal Bldg., $42,253; grading Project 36, Sect. 12-10-16, to J. W. McGerr, 2335 Washington St., $8,510.

Neb., McCook — Grading, curbing, concrete paving, Paving Dists. 14 and 15, to McCook Cement & Stone Co., McCook, $30,832.

Neb., Wausau—City Council, grading, curbing, guttering, sewers, 5 in. rein.-con. paving 21,410 sq.yd. Paving Dist. 5, to Booth & Olson, Inc., 518 Grain Exch. Bldg., Sioux City, Ia., $27,511.

Neb., Wilber—Saline Co., improving Projects 1-A, 1-B, 2, 4-A and 4-B, to Allied Contracts, Inc., 1803 Douglas St., Omaha, $17,615; Projects 3, 5-A and 5-B, to Yant Constr. Co., 1146 Omaha Natl. Bank Bldg., Omaha, $7,878. Noted Aug. 13.

New Hampshire — State Hy. Dpt., Concord, grading, 3 in. on 5 in. broken stone course surfacing 4.67 mi. Daniel Webster Hy., Grafton Co., to Portland Contg. Co., 102 Exchange St., Portland, Me., $86,988 est. $126,000; 3 in. bituminous macadam on 8 in. broken stone base course surfacing 1.26 mi. Cheshire Co., to Lane Constr. Corp., 37 Colony St., Meriden, Conn., $36,921 est. $36,000. Noted Aug. 20.

New Jersey—State Hy. Comn., Trenton, grading, 8 in. rein.-con. paving 4,305 sq.yd. Route 48, Sect. 26, Traffic Circle at Route 46, Pittsgrove, Salem Co., to C. D. Prosser, Pitman, $18,428. Noted Aug. 13.

N. J., Bayville—Berkeley Twp. Com., School House, grading, paving Bayview Ave. Sect. 2 from Barnegat Pier to Sloop Creek Rd. (a) borrow excav. (b) hydraulic fill, to Barnegat Constr. Co., Barnegat, (a) $18,106 (b) $26,804.

N. J., Imlaystown—Upper Freehold Twp. Com., Twp. Hall, grading, slag or trap rock penetration surfacing 8,100 sq.yd. Allentown-Crosswicks Rd., 20 ft. to S. S. Thompson Co. 170 Monmouth St. Red Bank. Est. $25,000. Noted June 4.

N. J., Mountain Lakes—Mayor and Boro Council, Boro Hall, 2 Boulevard West, curbing, drains, culverts, walls, bituminous penetration paving 2,500 lin.ft. Pocono-Raynold Impvt., to H. B. McDonald Constr. Co., 95 17th Ave., Paterson. Est. $25,000. Noted July 30.

New York—A. W. Brandt, comr. Hys., State House, Albany, bit. black top on concrete (top only to be constructed) paving 0.76 mi. R C 2075, Whitehall-Fairhaven Hy. 1542, County Hy. 1880 Whitehall Village, Boardman and Poultney Sts., Washington Co., to Interstate Amiesite Co., du Pont Bldg., Wilmington, Del., $8,562. Est. $9,730. Noted Aug. 6.

New York—A. W. Brandt, comr. Hys., Albany, concrete and bitmas paving 1.53 mi. Grand Central Parkway, Sect. 1, incl. grade separations at Parsons Blvd. and 184th St., and Grand Central Parkway, Sect. 2, Park 2, Queens Co., to Barford Constr. Co., White Plains, $276,279. Est. $390,735. Noted July 30.

New York—A. W. Brandt, comr. Hys., Albany, concrete paving 7.45 mi. hy. Monroe and Wayne Counties, to John Petrossi & Co., Inc., 6 State St., Rochester, $245,496 e.e. $371,360—6.31 mi. Delaware Co., to Roberts Paving Co., Salisbury, Md., $338,303 e.e. $529,465—9.01 mi. Saratoga Co., to M. F. Dollard, Jr., Inc., 36 State St., Albany, $379,465 e.e. $555,383—1.74 mi. Monroe Co., to Downing Eng. Constr. Corp., 134 Swan St., Buffalo, $111,618 e.e. $158,732—6.09 mi. Putnam and Westchester Counties, to M. A. Gamino Constr. Co., 728 Valley St., Providence, R. I., $349,056 e.e. $537,153—2.27 mi. Broome Co., to Onondaga Constr. Co., Inc., Syracuse, $229,548 e.e. $333,970—waterbound gravel repaving 0.17 mi. Westchester Co., to Wasko & Pecora, Inc., 57 Reding St., Yonkers, $32,058 e.e. $47,025—concrete and bituminous macadam (optional) repaving 4.35 mi. Fulton Co., to J. P. Whelan, Meshoppen, Pa., $205,211 e.e. $271,185—bituminous macadam (penetration method) paving 9.66 mi. Delaware Co., to National Eng. Corp., 262 West 26th St., New York, $56,380 e.e. $77,815—grading, structures, concrete paving 2.73 mi. Westchester Co., to Charles Shaffer & Son, 42 Skillen St., Buffalo, $214,493 e.e. $321,345—grading, structures 7.65 mi. Tompkins Co., to Baldwin Bros. Co., Union Trust Bldg., Cleveland, O., $158,523 e.e. $289,779. Grand total, $2,320,150. Noted July 16.

N. Y., Brooklyn—H. Hesterberg, pres. Brooklyn Boro, Boro Hall, asphalt resurfacing by heater method, Bay 19th St. to Cranford Co., 52 9th St., $63,139—asphalt paving Clarendon Rd. and Gravesend Ave., to Brooklyn Alcatraz Asphalt Co., 407 Hamilton Ave., $66,274 and $20,548 respectively—asphalt paving East 45th St. and Smith St., to D. J. McCoy Asphalt Co., Avenue U and East 57th St., $3,445 and $7,973 respectively—regulating East 38th St., etc., and Hendrickson St., to Concrete Co., Metropolitan Ave., $1,266 and $2,153 respectively—regulating and paving Linden Blvd., to Highway Impvt. & Repair Co., Meserole St., $309,147—asphalt paving Narrows Ave., to M. J. O'Hara, Neptune Ave. and West 19th St., $4,573. Grand total, $478,518.

N. Y., New York—H. Bruckner, pres. Bronx Boro, Crotona Park, 3rd and Tremont Aves., to Venetian Contg. Co., East Bay Ave. and Tiffany St., asphalt paving East 171st St., $5,530; Seton Ave., $18,901; bitulithic concrete paving Furman Ave., $4,883 — to A. Spadaro, 724 East 225th St., sewer in Fuller St., $3,315; West 263rd St., $5,002—to C. D. Beckwith, Inc., Seneca Ave. and Edgewater Rd., asphalt paving East 168th St., $1,167 — to

Streets and Roads (Continued)

Perotto Contg. Co., Inc., 1931 Haviland Ave., regulating, grading Lydig Ave., $2,890—to S. La Barbera, 65 Webster Ridge, New Rochelle, regulating Pitman Ave., $8,957 — to Empire Cinders Deliver, Locust Ave. and 134th St., furnishing 25,000 cu.yd. cinders, $25,500—to Vanbro Constr. Co., 24 Elizabeth St., West New Brighton, regulating Vincent Ave., $6,865. Grand total $83,010. Noted Aug. 12.

Ohio — **O. W. Merrell**, dir. hys., Columbus, rein.-con. paving 0.312 mi., Hamilton Co., to Paul Hill, Hill Ave., Dayton, $31,080—concrete paving 4.386 mi. Lawrence Co., to Frowine Bros., Portsmouth, $77,241—2.197 mi. Hamilton Co., to DeSalvo Constr. Co., Cincinnati, $126,683 — 0.572 mi., Washington Co., to Bellefontaine Development Co., Bellefontaine, $34,348—2.04 mi., Washington Co., to N. M. Lupo, Inc., Cleveland Heights, $48,373—tar macadam and concrete paving 3.207 mi., Belmont Co., to Lewis & Copeland Constr. Co., Lima, $68,559 — 2.357 mi., Ashland Co., to Mansfield Asphalt Paving Co., Mansfield, $30,740—brick, incl. furnishing, delivering brick paving 1.927 mi., Tuscarawas Co., to Parrel & Ray Strawser, 852 North Cassady Rd., East Columbus, $55,177—1.53 mi., Franklin Co., to R. J. Dienst, 297 South High St., Columbus, $150,500—0.809 mi., Jefferson Co., to Harry M. Bates, 250 South Court St., Steubenville, $42,891—tar surfacing 14.25 mi., Auglaize Co., to C. E. Edgington, Findlay, $9,685—17.26 mi., Belmont, Guernsey and Harrison Counties, to Stone Constr. Co., 452 South Pearl St., Columbus, $10,891—17.7 mi. Tuscarawas and Carroll Counties, to Trumbull Constr. Co., Warren, $19,258—4.34 mi. Coshocton and Perry Counties, to Allied Products Co., Cleveland, $6,897—13.46 mi. Guernsey Co., to Ray Strawser, Inc., 852 North Cassady Rd., East Columbus, $14,032—10.85 mi. Lorain Co., to H. J. Hart, 912 Middle Ave., Elyria, $4,998—11.08 mi. Geauga Co., 4.85 mi. Columbiana and Mahoning Counties and 11.93 mi. Portage Co., to J. L. McCormick, Ravenna, $16,158—8.2 mi. Pike and Ross Counties, to F. D. and W. H. Francis, 205 Franklin Bldg., Columbus, $23,843—7.3 mi. Wyandot Co., to U. S. Constr. Co., Upper Sandusky, $3,884—smoothing old brick pavement and tar resurfacing 0.447 mi. Gallia Co., to H. F. Dougherty, 409 Natl. Exchange Bank Bldg., Steubenville, $8,018. Grand total $783,256. Rejected bids grading, draining, brick or concrete paving 2.846 mi., Sects. "L," "C" and part of "D" Harrison Rd., Hamilton Co., brick $360,495. Noted Aug. 6.

O., Cleveland—Sheet ashpalt resurfacing 27,860 sq. yd. Prospect Ave., to Cleveland Trinidad Paving Co., Western Reserve Bldg., $52,336.

O., Cleveland—Comrs. Cuyahoga Co. brick surfacing 10,200 sq.yd. Fairmount Blvd. from Baldwin Rd. to East Boulevard, to Highway Constr. Co., Builders Exch. Bldg., $72,548; sheet asphalt paving 2,250 sq.yd. and brick surfacing 8,350 sq.yd. Fairmount Blvd. from East Boulevard to Kemper Rd., to H. G. Herring, Wayside Rd., $65,497. Noted Aug. 12.

O., Cleveland Heights—Sheet asphalt (lake) paving Scottsdale Blvd. and Nichols Rd., to Highway Constr. Co., Builders Exch. Bldg., Cleveland, $22,338 and $5,398 respectively.

O., Steubenville—Jefferson Co. Comm., concrete paving Wilson Run Rd., to Floto Bros. Constr. Co., Steubenville, $37,145. Est. $40,000. Noted Aug. 6.

Pennsylvania — State Hy. Dpt., Harrisburg, grading, drainage structures, waterbound macadam surfacing 41,052 sq.yd. McKean Co., to Smouse & Kreamer, Galeton, $95,760—18,979 sq.yd. Elk Co., to A. R. Menzies, Kenmore, N. Y., $36,714—1,850 sq.yd. Bucks Co., to J. Martin, Camp Hill, $11,964—grading, drainage structures, concrete surfacing 8,450 sq.yd. Armstrong Co., to Blue Ridge Constr. Co., Uniontown, $29,109—3,205 sq.yd. Bucks Co., to P. Diantonia, 224 East Hanover St., Trenton, N. J., $9,181. Grand total $182,728. Noted July 30.

Pa., Erie—Grading, drainage, structures paving French St. from 6th to 14th Sts., [illegible] and M. Doyle, 307 Walnut St., $22,367. Est. $25,000.

Pa., Meadville—G. L. Maxwell, supt. Streets & P. Impvts., City Bldg., concrete curbing, guttering, catch basins, brick on concrete paving 7,500 sq.yd. Clinton Court and Buttonwood Alley, and repaving North Water St., to Keystone Constr. Co., Meadville. Est. $25,000. Noted Aug. 6.

Pa., Pittsburgh—Repaving Bloomfield Bridge, to A. F. Johnson, 1201 West Liberty Ave., $18,136. Est. $25,000.

Pa., West View—City Council, concrete paving 4 streets in Wellington Heights Plan, to D. W. Challis Co., Centennial Ave., Sewickley. Est. $25,000.

Utah—State Road Comm., Salt Lake City, bituminous concrete paving 3.5 mi. Lincoln Hy. from mouth of Parley's Canyon to cement plant, State Aid Project 332, Salt Lake Co., to C. S. Harris, Price, $26,510. Est. $31,592; concrete paving 1.752 mi. 33rd South St., from Main St. to Jordan River Bridge, State Aid Project 331, Salt Lake Co., to Gibbons & Reed, Salt Lake City, $54,464. Est. $52,800. Noted Aug. 19.

Utah—State Road Comm., Salt Lake City, grading, graveling 9.31 mi. hy. from Vernal to Jensen, Nintah Co., to Young & Ogden, Richfield, $82,526. Est. $89,231. Noted Aug. 19.

Virginia—State Hy. Dpt., Richmond, grading, drainage structures, macadam surfacing 0.142 mi. Route 33, Project F-640-A1 Roanoke Co., to J. R. Vaughn & Co., Roanoke, $3,494 — 13.519 mi. Route 40, Project F-326-AB Norfolk Co., to Robert Martin Co., Inc., Salem, $110,307—25 ft. rein.-con. beam span bridge over Kingsland Creek, Route 31, Project S-173-B1 Chesterfield Co., to Perkins-Barnes Constr. Co., Blackstone, $2,119. Grand total $115,920. Noted Aug. 13.

Washington—D. J. Humes, dir. Hys., Olympia, grading, crushed stone surfacing 8.4 mi. road in Lincoln Co., to M. J. Kuney Co., Hutton Bldg., Spokane, $80,974—crushed stone surfacing 3.9 mi. Walla Walla Co., to Lyon & Price, Spokane, $29,991—grading, drainage structures 0.2 mi. Pierce Co., to Coast Contractors, Inc., 2330 Fawcett St., Tacoma, $7,027—2 bridges over Yakiba and Naches Rivers, Yakima Co., to D. Nybren, Seattle, $110,787—2 concrete bridges, 2 concrete box culverts, Kittitas Co., to Concrete Constr. Co., Seattle, $20,945. Grand total $249,724. Noted Aug. 6.

Washington—State Hy. Comm., Olympia, improving 1.3 mi. Snohomish Co., to N. Fiorito, 844 West 48th St., Seattle, $40,860—4.356 mi. Lincoln Co., to D. A. Sullivan & Co., Box 870, Coeur d'Alene, Idaho, $35,639 — 11.278 mi. Lincoln Co., to General Constr. Co., 553 Colman Bldg., Seattle $145,627—19.75 mi. Pend Oreille Co., to Joslin & McAllister, 512 Realty Bldg., Spokane, $48,938—4.199 mi. Walla Walla Co., to W. Zickler, Neppel, $29,367. Grand total $300,431.

Wisconsin—State Hy. Comm. and Hy. Coms. of Brown, Door and Outagamie Counties, Court House, Green Bay, improving Redwing-Ellsworth Rd., Pierce Co., to L. G. Arnold, Inc., Eau Claire, $24,672—concrete surfacing 4.833 mi. Brown Co., to P. T. Fess, Madison, $98,749—8.333 mi. Green Bay-Oneida Rd., to Schuster Constr. Co., Denmark, $140,735 — 3.395 mi. Door Co., to W. Conway, Madison, $70,435—0.083 mi. in city of Kaukauna, to Bay McCarty, Kaukauna, $4,045 — 0.244 mi. New London-Greenville Rd., to Garvey-Weyberg Constr. Co., Appleton, $6,625—crushed gravel shoulders on 7.853 mi. Green Bay-Sturgeon Rd., to M. Bickey, Appleton, $6,137. Grand total $351,398.

Wisconsin—State Hy. Comm. and Hy. Coms. Crawford, Iowa and Richland Counties, Lancaster, crushed stone surfacing 8 mi. road in Crawford Co., to Interstate Constr. Co., Madison, $11,972—8.026 mi. Iowa Co., to P. W. Ryon Sons, Janesville, $13,481 — grading, drainage structures, concrete surfacing 0.55 mi. Grant Co., to J. D. Bonness, Inc., 541 48th St., Milwaukee, $14,993—clearing, grading, guard rail, gravel surfacing 0.35 mi. Grant Co., to White & Leppla, Potosi, $5,009 — grading, drainage structures, concrete surfacing 1.657 mi. Richland Co., to A. Brown & Co., Chippewa Falls, $26,651. Grand total $72,106. Noted July 23.

Wisconsin — State Hy. Comm. and Hy. Com. Oneida Co., Rhinelander, clearing, grubbing, grading, drainage structures 4.38 mi., Rhinelander-Lake George Rd. and approaches to overhead, U. S. Hy. 8, State Projects 7881 and 7882, to Peterson Constr. Co., 502 Globe Bldg., Minneapolis, Minn., $43,628.

Wyoming — State Hy. Comm., Capitol Bldg., Cheyenne, surfacing 9.819 mi. road in Washika Co., to Wilsona Welch Constr. Co., Cowley, $43,538—oil processing 14.414 mi. Goshen Co., to R. Spatz, Cheyenne, $15,881 — 2.213 mi. Wheatland-Douglas Rd., Goshen Co., to W. A. Norris, Inc., Cheyenne, $9,141 — 15 timber trestles and miscellaneous grading 26.712 mi. Carbon Co., to Sharrock-Pursel, Casper, $130,253—3 I-beam span bridge over Union Pacific R.R., Carbon Co., to J. E. Crum, Casper, $6,493—23 ft. pile trestle bridge, Goshen Co., to F. J. Anderson, Casper, $1,196. Grand total $205,502. Noted Aug. 20.

Wyoming—Pub. Wks., Denver, Colo., grading, drainage structures 9.399 mi. Terrycas-Obsidian Cliff, section of Grand Loop National Park Hy., Yellow Stone Natl. Park, Yellowstone Co., to Stevens Bros., St. Paul, Minn. $140,127.

Ont., Hamilton—Asphalt paving Dunsmure Rd. from Ottawa St. to Glenlake St., day labor. $25,866. W. L. McFaul, City Hall, engr.

Ont., Owen Sound—Grey Co., concrete paving 1 mi. road in Meaford, to King Constr. Co. Ltd., Oakville. Est. $25,000.

Ont., Toronto—City Council, asphalt paving Albert St. and part of Elizabeth St., to Rayner Constr. Co., Ltd., 159 Bay St., $21,327—part of Elizabeth St., to Constructing & Paving Co., Ltd., Confederation Life Bldg., $7,696—Spadina Ave., to Law Constr. Co., Ltd., 225 Sterling Rd., $7,321—Beaumont Rd. and Osler Ave., to Kilmer & Barber Ltd., Harbour Bldg., $15,361—Parliament St., to McNamara Constr. Co., Ltd., 53 Yonge St., $12,944—concrete paving lane, to A. Demo, 220 Claremont St., $2,039. Grand total, $66,688.

Ont., Willowdale—North York Twp. grading, concrete sidewalks from Concession 1 to 50th Ave., along Yonge St., day labor. $25,000. G. Baker, Twp. Offices, engr.

Que., Aylmer (East)—Law Twp. roadwork, to Laflamme & Laflamme, 363 Sherbrooke St. W., Montreal, $46,500.

EXCAVATION, DRAINAGE, IRRIGATION, LEVEES, RIVER AND HARBOR

PROPOSED WORK

Calif., Monterey—C. A. Dorsey, city clk., dredging 80,000 cu.yd., in connection with El Estero Project. Bids returned unopened due to failure to provide for "prevailing wage scale" in specifications as provided in recently adopted state statute.

Pa., Titusville—Amer. Petroleum Institute, 250 Park Ave., New York, 1,800 ft. dike, 8 ft. average height, 40 ft. at base, earth fill, stone faced on creek side, incl. 12,000 cu.yd. fill and excav., in Colonel Drake Memorial Park, near here. $60,000. B. B. Weber, City Bldg., Oil City, engr. City and Venango Co. will build road from Titusville to site.

BIDS ASKED

La., Lake Charles—Sept. 24, by Bd. Comrs. Gravity D. D. 3, constructing main drainage canal, laterals, incl. 140,000 cu.yd. excav. F. Shutts & Sons, Lake Charles, engrs.

Mass., Cohasset—Sept. 8, by Dpt. P. Wks., State House, Boston, A. W. Dean, engr., dredging 31,000 cu.yd. to depths 6 and 8 ft. mean low water in Cohasset Harbor, for Commonwealth of Massachusetts.

Mass., Marshfield—Sept. 8, by Dpt. P. Wks., State House, Boston, 4,000 tons heavy stone rip rap and 3,000 tons stone chips to protect 2,000 lin.ft. bank, timber, bulkhead and concrete seawall south of Shepard St., Brant Rock. A. W. Dean, Dpt. P. Wks., Boston, engr.

Mississippi—Sept. 8, by State Hy. Comm., Jackson, hydraulic settlement of fills in various parts of state, incl. 2,834,500 cu.yd. excav. G. A. Draper, ch. engr.

N. J., Keansburg—Sept. 15, by Boro Council, Boro Hall, timber jetties at Granville Park, Allen & Randolph, 60 Broad St., Red Bank, engrs.; adv. E. N.-R. Sept. 3.

N. Y., Brooklyn—Sept. 4, by Bd. Transportation, 250 Hudson St., New York, constructing new pier and piershed, incl. removal existing Pier 6 at foot of Cranberry St.

CONTRACTS AWARDED

Ala., Birmingham—A. J. Hawkins, city engr., straightening, widening, deepening Village Creek from 75th to 80th Sts., to H. N. Bonahoo Contg. Co., 510 North 21st St., $13,140. Noted Aug. 13.

Calif., Newport Beach—See "Dams."

Ind., Crown Point—Lake Co., constructing Beaver Dam Ditch, to B. D. McColly & Sons, Remsclaer, $15,999. Est. $26,710.

Ind., Vincennes—Knox Co., constructing Wolf-Brocksmith Drainage System, incl. main ditch, 15 laterals, to L. Keene, Sullivan, $12,984. Est. $35,000. Noted Aug. 14.

Md., Baltimore—Harbor Bd., E. E. Hammond, Harbor engr., Recreation Pier, dredging 110,000 cu.yd. in Baltimore Harbor, to Arundel Corp., Pier 2, Pratt St., $46,350.

N. J., Asbury Park—Bd. City Comrs., City Hall, timber bulkheads along north shore, to F. McDowell, 720 Mattison Ave., Asbury Park, $21,195. Noted July 7.

N. J., Long Branch—Bd. City Comrs., City Hall, 2 timber, stone jetties north and south of Bath Ave., to J. Howland, 1st St., Manasquan. Est. $25,000. Noted June 11.

Tex., Brownsville—Bd. Educ., drainage work, incl. tile draining Tucker Field, to D. W. Bennett & Son, Brownsville, $25,000 cost plus percentage basis. Noted Aug. 20.

Wis., Milwaukee—Bd. Harbor Comrs., retaining bulkhead in Lake Michigan and dredging in Kinnickinnic River Basin, to E. E. Gillen Co., 228 East Water St., $403,716.

Ont., Port Arthur — Dpt. P. Wks., Ottawa, rubble mound breakwater in main harbor, to Chambers, McQuigge & McCaffrey, 21 Dundas Sq., Toronto, $117,500.

Bond Elections

Coming Bond Elections

Water Distribution System — Urbandale, Ia., Sept. 14, $20,000. E. T. Archer & Co., Kansas City, Mo., engrs.

Waterworks and Distribution System—Clayton, Kan., Sept. 15, $18,500. E. T. Archer & Co., Kansas City, Mo., engrs.

Reservoir, Filter Plant and Distribution System—Maysville, Mo., Sept. 15, $50,000. W. E. Rollins & Co., engrs.

Sewage Disposal Plant—New Bremen, O., November, $40,000.

Trunk Sewer and Sewage Disposal Plant — Rapid City, S. D., Sept. 1, $215,000. J. P. Soderstrom, city engr.

Fire Alarm System—Lubbock, Tex., $14,000. Engineer not appointed.

Jr. High School—Sacramento, Calif., Oct. 20, $1,146,000.

High School and Jr. College — Santa Monica, Calif., $810,000. Architect not appointed.

High School — Midland, Mich., Sept. 15, $425,000.

Bonds Voted

Waterworks and Sewer Impvts.—Valdese, N. C., $150,000.

Sewer Extensions—Las Vegas, N. M., $150,000. W. L. Buckman, Kansas City, Mo., engr.

Airport Impvts.—Texarkana, Ark., $20,000.

Court House and Jail—Longview, Tex., $200,000. Gregg Co., c/o W. R. Hules, Judge.

FEDERAL GOVERNMENT

PROPOSED WORK

Ala., Auburn—POST OFFICE—Treas. Dpt. at office Supt. Archt., U. S. Post Office.

Calif., Alameda—AIRPORT——Dpt. Commerce, Aviation Serv., plans by L. Larson, constructing quartermaster, 33 Pacific Ave., 100 x 180 ft. administration building, 334 x 480 ft. depot supply building, 200 x 440 ft. hangar, also heating plant, pumping station, water houses, radio station. $743,000. Ultimate cost $2,700,000. Noted Nov. 20.

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Federal Government (Continued)

Calif., Stockton—DREDGING—U. S. Eng. Office, California Fruit Bldg., Sacramento, 1,000,000 cu.yd. from below Burns Cut-off to El Dorado Pump, near here, in connection with deep water project.

Ga., Augusta — ADMINISTRATION BUILDING—Vet. Bu., c/o L. H. Tripp, ch. Constr. Div., Wash., D. C., plans by P. M. Feltah, c/o U. S. Veterans' Hospital, 48 Peachtree Rd., Atlanta, 4 story, basement, 116 x 275 ft., rein.-con., brick, tile, steel, administration building, $200,000.

Me., Fort Fairfield—STATION—Treas. Dpt. at office Sup. Archt., border station. $63,900.

Me., Orono—POST OFFICE—Treas. Dpt., sketches 1 story, basement, brick, stone, Bennock Rd. and Forest Ave., $80,000.

Mass., Easthampton—POST OFFICE—Treas. Dpt., 1 story, basement, brick, stone, High and Union Sts. $100,000.

Neb., David City—POST OFFICE—Treas. Dpt. at office Sup. Archt., concrete, brick, stone, D and 4th Sts. $75,000.

Neb., Grand Island—POST OFFICE and COURT HOUSE—Treas. Dpt. plans by C. W. Steinbaugh, 662 Brandeis Theatre Bldg., Omaha, extending, remodeling post office and court house.

Neb., Sidney—POST OFFICE—Treas. Dpt., purchased site and plans rein.-con., brick, stone, 9th Ave. and Illinois St. $80,000. J. A. Wetmore, c/o Owners, acting superv. archt.

N. Y., Hempstead — POST OFFICE — Treas. Dpt. at office Sup. Archt., U. S. Post Office. To exceed $150,000. Tooker & Marsh, 101 Park Ave., New York, archts. **Maturity about December.** Noted Aug. 20.

N. Y., Oswego — DREDGING — U. S. Dist. Engrs. Office, Buffalo, surveys and takes bids before Nov. 1, dredging from north line of Seneca St. through to deep water sections and channels into Lake Ontario, removal of 2 islands in Oswego River, maximum depth of 21 ft. $1,000,000. W. S. FitzSimons, Oswego, engr. in charge Oswego Harbor.

Okla., Clinton—HOSPITAL—Dpt. Interior, C. J. Rhoads, comr. Indian Affairs, sketches brick, concrete, Cheyenne-Arapahoe Indian Reservation. $90,000. Private plans.

R. I., East Greenwich—POST OFFICE—Treas. Dpt., 1 story, basement, brick, stone, post office. $65,000.

Tex., Beaumont—POST OFFICE, etc.—Treas. Dpt. at office Sup. Archt., plans by F. W. and D. E. Steinmen, and F. Stone, Beaumont, federal building and post office. $500,000. Noted Aug. 19.

Tex., Fort Worth—FEDERAL—Treas. Dpt. at office Sup. Archt., plans by W. G. Clarkson & Co., 1819 Vaughan Bldg., federal building, Lamar and 10th Sts. Noted Aug. 14.

Va., Cape Charles—POST OFFICE—Treas. Dpt., office of Superv. Archt., purchased site and plans post office. $85,000.

BIDS ASKED

Ala., Mobile—DREDGING—Sept. 18, by U. S. Eng., 3,400,000 cu.yd. material in Gulfport Ship Channel and Anchorage Basin, Miss.

Ala., Montgomery—FUELING SYSTEM—Sept. 21, by Con. Q.M., Maxwell Field, underground gasoline fueling system for airplanes at Maxwell Field; adv. E. N.-R. Sept. 3.

Arkansas—OFFICE—Sept. 9, by U. S. Eng., 1006 McCall Bldg., Memphis, Tenn., office building at U. S. Supply and Repair Depot on west bank of Mississippi River, opposite Memphis, Tenn.

California—ROADS—Sept. 15, by Pub. Rds., 461 Market St., San Francisco, grading, structures on 1.156 mi. Sect. "B" Mill Creek Natl. Forest Hy., San Bernardino Co.

Calif., Sunnyside—FOUNDATION—Sept. 23, by Yards & Docks, concrete founds. for hangar, $200,000.

Conn., Hartford—ELEVATOR PLANT—Sept. 10, by U. S. Govt., elevator plant, post office and court house.

D. C., Wash.—FOUNDATION—Sept. 8, by Dpt. Justice, found. for Department of Justice Building. Noted Mar. 19.

D. C., Wash.—PORTLAND CEMENT—Sept. 10, by A. L. Flint, genl. purch. officer, Portland cement, Schedule 2681.

Fla., Jacksonville—DREDGING—Sept. 8, by U. S. Eng., 175,000 cu.yd. from St. Lucie River between Lock 2 and Station 325-00, below Palm City Bridge.

Ga., Augusta — CLINICAL BUILDINGS — Sept. 22, by Vet. Bu., clinical buildings, incl. walks, roads, etc.

Idaho, Boise—INFIRMARY—Sept. 21, by Treas. Dpt. at office Sup. Archt., infirmary building.

Idaho, Boise — VETERANS' HOSPITAL —Sept. 21, by U. S. Veterans' Bureau, infirmary building and connecting corridor, addition to veterans' hospital. $250,000. J. A. Wetmore, Wash., D. C., superv. archt.

Kansas—HANGAR—Sept. 21, by Con. Q. M., Fort Riley, air corps double hangar with annexes at Marshall Field adv. E. N.-R. Sept. 3.

Ky., Harlan—POST OFFICE—Sept. 17, by Treas. Dpt. at office Sup. Archt., 2 story, rein.-con., brick, stone. J. A. Wetmore, acting sup. archt.

Ky., Louisville—REVETMENT—Sept. 22, by U. S. Eng., P. O. Box 72, 2,300 lin.ft. bank revetment and paving in Ohio River at Stewarts Island and 688 lin.ft. back channel dike and adjacent bank protection in Ohio River at Pryors Island; adv. E. N.-R. Sept. 3.

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La., Shreveport—FIRE STATION, etc.—Sept. 28, by Con. Q. M. Barksdale Field, 1 fire station and guard house, at Barksdale Field; adv. E. N.-R. Sept. 3.

La., Shreveport — GAS DISTRIBUTION SYSTEM — Sept. 18, by Con. Q. M., Barksdale Field, gas distribution system and furnishing, installing 6 in. compound water meter at Barksdale Field; adv. E. N.-R. Sept. 3.

La., Shreveport—HANGARS, etc.—Sept. 14 (extended date) by Con. Q. M., Barksdale Field, 4 air corps double hangars, 1 air corp hangar, wing operation buildings, 1 air corps warehouse and 1 assembly building, at Barksdale Field. Noted Aug. 6.

Mass., Gloucester—BREAKWATER—Sept. 11, by U. S. Eng., Custom House, Boston, breakwater, incl 480 tons stone, 1,200 tons rubblestone, resetting 600 tons stone, 30 short tons pins.

Mass., Rutland—HOSPITAL—Oct. 20, by Vet. Bu., Arlington Bldg., 2 story, brick, rein.-con., tile hospital additions and warehouse facilities; electrical underground distribution system, and sewerage system, incl. pumps, sludge beds, piping, service connections and chlorinators. Noted July 16.

Michigan—DREDGING—Sept. 22, by U. S. Eng., Detroit, Mich., Lake Nicolet, St. Mary's River; adv. E. N.-R. Sept. 3.

Mo., St. Louis—REVETMENT—Sept. 10, by U. S. Eng. 428 Custom House, 2,500 to 4,500 lin.ft. at Brunkhorst, 3,000 to 4,000 lin.ft. at Cornice Island; 3,000 to 6,500 lin.ft. at Chesley Island; 1,500 to 3,000 lin.ft. at Buffali Island; 4,000 to 12,000 lin.ft. Cape Girardeau; 1,500 to 3,000 lin.ft. at Little Flora Creek; adv. E. N.-R. Sept. 3.

N. H., Portsmouth — REFRIGERATION EQUIPMENT — Spec. 6634 — Sept. 16, by Yards & Docks, Navy Dpt., refrigerating equipment for ice boxes.

N. J., Newark—POST OFFICE and COURT HOUSE—Treas. Dpt. at office Sup. Archt., bids about Jan. 15, general contract 2 and 3 story, basement, brick, rein.-con., steel, plain found. Vroom Alley, Franklin, Washington and Mulberry Sts. $6,150,000. W. E. Lehman and G. O. Totten, 972 Broad St., archts. J. A. Wetmore, Treas. Dpt., Wash., D. C., assoc. archt. Noted July 2.

N. J., Salem—POST OFFICE—Sept. 9, by Treas. Dpt. at office Superv. Archt., U. S. Post Office. $80,000.

N. Y., Brooklyn—WIRE—Sept. 22, by Signal Supply Officer, Army Base, 58th St. and 1st Ave., wire.

N. Y., New York—APARTMENT—Sept. 22, at office Con. Q.M., 39 Whitehall St., non-commissioned officer's apartment building at Fort Jay, Governor's Island; adv. E. N.-R. Sept. 3.

North Carolina—DREDGING—Sept. 17, by U. S. Eng., Office, 394,046 cu.yd. in Inland Waterway between Currituck Sound and Albermarle Sound; adv. E. N.-R. Sept. 3.

N. C., Lumberton—POST OFFICE—Sept. 11, by Treas. Dpt., at office Superv. Archt., U. S. Post Office. $105,000.

N. D., Ambrose—INSPECTION STATION—Sept. 22, by Treas. Dpt., at office Superv. Archt., inspection station. $50,000.

O., Findlay—POST OFFICE—Treas. Dpt. at office Sup. Archt., sketches by Wilbour Watson & Associates, 4614 Prospect Ave., Cleveland, 1 story, brick, stone, steel, concrete U. S. Post Office, on 200 x 200 ft. site. $195,000.

O., Painesville—POST OFFICE—Treas. Dpt. at office Sup. Archt., plans by Fulton & Taylor, 8120 Euclid Ave., Cleveland, 1 story, brick post office. $180,000.

Oregon—BRIDGES—Sept. 9, by Pub. Rds., Portland, bridges on Rouge River, on Roosevelt Hy., Curry Co. W. H. Lynch, Portland, engr.

Oregon—BRIDGE—Sept. 10, by Pub. Rds., Portland, bridge on John Day Hy., Camas Creek, Umatilla Co. W. H. Lynch, dist. engr.

Pa., Altoona—POST OFFICE—Sept. 18, by J. A. Wetmore, superv. archt. Treas. Dpt., Wash., D. C., 2 story, basement, mezzanine, 70 x100 ft., U. S. Post Office, 12th St. and 11th Ave., $425,000, also for wrecking 4 story, brick building. Royer & Anglemeyer, Commerce Bldg., archts. Noted Feb. 26.

R. I., Newport—PASSENGER ELEVATOR—Spec. 6560—Sept. 16, by Yards & Docks, Navy Dpt., passenger elevator.

Tenn., Johnson City—HOSPITAL—Oct. 6, by Vet. Bu., Arlington Bldg., hospital addition and barracks, roads, walks, grading, drainage. Noted Aug. 6.

Tex., Wichita Falls—POST OFFICE and FEDERAL BUILDING—Sept. 21, by Treas. Dpt. at office Sup. Archt., 3 story, part basement, 96 x 135 ft., brick, steel, rein.-con. $500,000. Voeleker & Dixon, 207 Perkins & Snyder Bldg., archts. Noted June 4.

Va., Langley Field—WAREHOUSES—Sept. 22, at office Con. Q.M., Langley Field, 2 air corps warehouses; adv. E. N.-R. Sept. 3.

Va., Langley Field—HANGARS—Sept. 29, by Con. Q. M. plank deck and built-up roof for air corps hangars and connecting bays at Langley Field; adv. E. N.-R. Sept. 3.

CONTRACTS AWARDED

Ala., Albertville—POST OFFICE—Treas. Dpt. at office Sup. Archt., constructing U. S. Post Office, to Adams Constr. Co., Wash., D. C., $59,950. Noted July 16.

Ark., Little Rock—POST OFFICE, etc.—Treas. Dpt. at office Sup. Archt., U. S. Post Office and Court House, to R. P. Farnsworth Constr. Co., Maritime Bldg., New Orleans, La., $802,600. Noted July 23.

Ark., Stuttgart—POST OFFICE—Treas. Dpt. at office Sup. Archt., U. S. Post Office, to H. J. Gilbertson Constr. Co., Graham Bldg., Memphis, Tenn., $46,300. Noted July 30.

California—ROAD—C. H. Sweetser, dist engr. Pub. Rds., 461 Market St., San Francisco, bituminous binder on crushed rock surfacing 9.614 mi. Quincy-Beckwith Natl. Forest Hy., Plumas Co., to Basalt Rock Co., Napa, $20,224.

California—ROADS—C. H. Sweetser, dist engr. Pub. Roads, 461 Market St., San Francisco, bituminous treatment surfacing 3.74 mi. Long Barn-Stoddard Springs Rd., Route 38 Sec. more Natl. Forest Hy., Tuolumne Co., and 3.085 mi. Sect. B, Route 35, Ebbetts Pass Natl. Forest Hy., Calaveras Co., to A. Teicher & Sons, 1846 37th St., Sacramento, $54,455 and $48,153 respectively. Noted July 16.

Calif., Monterey — BREAKWATER — U. S. Eng., Custom House, San Francisco, breakwater, Monterey Bay, to G .F. Atkinson, Russ Bldg., San Francisco, $384,000. Noted May 14.

D. C., Wash.—HEALTH CENTER—Treas. Dpt. at office Sup. Archt., public health building, to Wills-Taylor & Mafera, 303 West 42nd St., New York, $766,000.

Ga., Fort Benning—BARRACKS—Con. Q.M. medical detachment barracks, to J. C. Miller, Campbellsville, Ky., $68,528. Noted June 18.

Ill., Carrollton—POST OFFICE—Treas. Dpt. at office Sup. Archt., U. S. Post Office, to McCarthy Bros., 4903 Delmar St., St. Louis, Mo., $47,180. Noted July 30.

Ill., Chicago—POST OFFICE—Treas. Dpt. at office Sup. Archt., general contract U. S. Post Office, to John Griffiths & Sons Co., 228 North La Salle St., $13,459,970; installing mail-handling equipment, to Lamson Co., Inc., Eastwood St., Syracuse, N. Y., $1,760,077; installing elevator equipment, to Westinghouse Elevator Co., 20 North Wacker Dr., $739,500. Grand total $15,959,547. Noted Aug. 19.

Ind., Fort Wayne—POST OFFICE, etc.—Treas. Dpt. at office Sup. Archt., U. S. Post Office and Court House, to Ralph Solitt & Sons Constr. Co., South Bend, $503,000. Noted July 16.

Ind., South Bend—POST OFFICE—Treas. Dpt. at office Sup. Archt., U. S. Post Office, to J. Barnes, Logansport, $685,000. Noted July 16.

Ky., Barbourville — POST OFFICE — Treas. Dpt. at office Sup. Archt., U. S. Post Office, to J. I. Barnes, Logansport, $49,900. Noted July 16.

La., Shreveport — DISTRIBUTION SYSTEM —Con. Q. M., Barksdale Field, electric distribution system, entrance structures, to Electrical Contg. & Eng. Co., 518-20 Gravier St., New Orleans, $52,750. Noted July 16.

Mississippi, Arkansas and Louisiana—DREDGING—U. S. Eng., P. O. Box 667, Vicksburg, Miss., to Morrow & Harris, Yazoo City, Miss., 200,200 cu.yd. Black Bayou Enlargement at $0.1119 per cu.yd.; to Horton-Price Constr. Co., Eldorado, Ark., 1,158,800 cu.yd. in State Line Setback and Enlargement $0.153, 754,800 cu.yd. in Lake Gassoway Setback and Enlargement $0.153, 755,400 cu.yd. in Pilcers Point Enlargement $0.153; to Grasser Contg. Co., 1810 Amer. Bank Bldg., New Orleans, La., 781,900 cu.yd. in Old River Enlargement $0.18, 1,250,000 cu.yd. Old River Setback, $0.1115; to Elkas & Stevenson, Dumas, Ark., 456,000 cu.yd. in Kretchmar Enlargement $0.177, 140,000 cu.yd. Lake Belcoe Levee, $0.19; to Rodgers, Jones & Uzzele, 62 South Front St., Memphis, Tenn., 2,733,120 cu.yd. Wilson Point; new Levee $0.155; to Lowrance Bros. & Co., Inc., Driver, Ark., 333,300 cu.yd. Black Bayou Enlargement $0.205; to Lewis-Chambers Constr. Co., Inc., 1743 Canal Bank Bldg., New Orleans, La., 462,000 cu.yd. James Crossing Setback $0.1525, 715,200 cu.yd. Princeton to Carolina Enlargement $0.145; to Callahan Walker Constr. Co., 1200 1st Natl. Bank Bldg., Omaha, Neb., 3,881,600 cu.yd. Lake Lee Setback $0.1443; to Sternberg Co., Inc., St. Louis, Mo., 2,935,400 cu.yd. Seven Oaks to Mosswood Enlargement and New Levee $0.1375; to W. H. Dennison, Cushman, Ark., 1,364,000 cu.yd. Longwood Enlargement $0.198, 615,400 cu.yd. Elton Slough Enlargement $0.187, 693,680 cu.yd. Lake Providence Front New Levee and Enlargement $0.1948. Noted July 30.

Missouri—PILE DIKES—U. S. Eng., Kansas City, 7,500 ft. standard pile clump dikes in Missouri River at Little Missouri and Glasgow Bends to C. W. Hunter Co., 177 South Front St., Memphis, Tenn., $426,956. Noted Aug. 20.

Mo., Centralia—POST OFFICE—Treas. Dpt. at office Sup. Archt., 1 story, basement, 66 x 73 ft., rein.-con., brick, stone, to McCarthy Bros. Constr. Co., Roosevelt Hotel Bldg., St. Louis, $49,950. Noted May 7.

Mo., Lamar—POST OFFICE—Treas. Dpt., office Sup. Archt., U. S. Post Office, to O. L. Allen, 1840 North Douglas Ave., Springfield, $44,785. Noted June 11.

Mo., St. Louis—LEVEE—U. S. Eng., enlarging levee of Crane Creek Drainage and Levee Dist., to Union Constr. Co., 200 New York St., Des Moines, Ia., $39,093.

N. H., Claremont—POST OFFICE—Treas. Dpt. at office Sup. Archt., U. S. Post Office, to W. H. Trumbull, Hanover, $63,135. Est. $95,000. Noted June 25.

New Jersey—DREDGING—U. S. Eng., 39 Whitehall St., New York, 87,700 cu.yd. Raritan River, to Arundel Corp., foot Fulton St., Brooklyn, N. Y., $81,561.

N. Y., Mineola—POST EXCHANGE, etc.—At office Con. Q. M., Mitchell Field, 4 hangars, 1 machine shop, 1 a.c. machine shop, 1 headquarters and operations building 1 parachute building, 1 photographic building, 1 radio building, paint oil and dope house, quartermaster's maintenance shop, warehouse and garage, post exchange and fire station and guardhouse and 2 boiler houses, to J. A. Morrow & Owens, 144

Federal Government (Continued)
West 47th St., Chicago, Ill., $761,707. Noted July 2.

O., Cleveland—HOSPITAL—Treas. Dpt. at office Sup. Archt., landscaping, grading, retaining walls, driveways, paving, etc., around new Marine Hospital, to Speedway Constr. Co., 3441 Lee Rd., $39,652. Noted July 30.

Tenn., Memphis—LEVEE—U. S. Engr., 380,000 cu.yd. levee work on Mississippi River in Upper Yazoo Levee Dist., to A. Guthrie & Co., Builders Exch. Bldg., St. Paul, Minn., $39,900.

Tex., Brownsville — POST OFFICE, etc.— Treas. Dpt. at office Sup. Archt., 2 story, basement, brick, steel, U. S. Post Office and Federal Building, to A. J. Rife Constr. Co. 1913 North Harwood St., Dallas, $329,000. Noted July 23.

Utah, Coalville—DAM—Bureau Reclamation, Denver, Colo., concrete parapet wall and curb along top of dam, gravel surfacing crest of Echo Dam of Salt Lake Reclamation Project, to Cox & Christianson, Provo. $15,345. Noted Aug. 19.

Va., Woodstock—POST OFFICE—Treas. Dpt. at office Sup. Archt., Post Office, to Nicholas Co., Phila., Pa., $32,950. Noted July 16.

Washington—ROAD—Pub. Rds. grading section Inland Empire Hy., Colville Forest, to C. J. Erickson, 1550 North 34th St., Seattle, $112,015.

Wis., Madison—LABORATORY—U. S. Dpt. Agriculture, 6 story, 277 x 469 ft. concrete steel, limestone products laboratory, to C. B. Fritz & Co., Madison, $727,648. Noted Aug. 10 Daily.

Wyoming—ROAD — Pub. Roads, Denver, Colo., constructing 5 mi. hy. at south approach to Yellowstone Park, to Morrison-Knudsen Co., 319 Bway., Boise, Idaho, $77,500. Noted Aug. 12.

P. R., Ponce—POST OFFICE, etc.—Treas. Dpt. at office Sup. Archt., U. S. Post Office and Court House, to T. H. Johnson, North Texas Bldg., Dallas, Tex., $158,658. Noted July 16.

RAILWAYS

BIDS ASKED

Texas—See "Contracts Awarded."

CONTRACTS AWARDED

Texas—R. G. Gowdy, ch. engr. Fort Worth & Denver Northern R.R., subsidiary Colorado & Southern Ry., Denver, Colo., grading 11 mi. between Childress and Red River, to Oran Speer, Alvord. Takes bids in November for stations and section house; rail work contract to be let later. Noted Aug. 27.

Texas—Winter Garden Belt Ry. Co., c/o W. O. Fitch, Eagle Pass, 40 mi. railway line from Asherton to Eagle Pass, incl. laying track, bridges, to Walter Dennison & Sons, Cushman, Ark., $110,000. Noted Apr. 23.

SUBWAYS AND TUNNELS

CONTRACTS AWARDED

Pa., Phila—Dpt. City Transit, C. E. Myers, dir., City Hall Annex, Contr. 318, subway entrance enclosure, to Art Bronze & Iron Wks., Danville, $8,975.

GRADE CROSSINGS

PROPOSED WORK

Ind., South Bend — City, grade separation, Western Ave., $1,000,000. Address City Clerk.

N. Y., Gainesville—Erie R.R., G. S. Fanning, ch. engr., Cleveland, O., bids late in fall general contract grade separation on Warsaw-Gainesville state hy. south of Rock Glen Station, $103,800.

Texas—State Hy. Comn., W. R. Ely, chn., Austin, concrete, steel overpass across C.R.I. & P. R.R. on Hy. 75, F.A.P. 547-F, Wheeler Co., G. G. Wicklin, Austin, brdige engr.

Texas—Highway Comn., W. R. Ely, chn., Austin, concrete, steel overpass across Galveston, Harrisburg & San Antonio Ry. Co., Hy. 3, F.A.P. 484-D, Brackettville, Kinney Co. G. G. Wickline, Austin, br. engr.

Texas—State Hy. Comn., W. R. Ely, chn., Austin, steel, concrete underpass on Hy. 1, 1 mi. west of Baird, $25,000. G. G. Wicklin, Austin, br. engr.; steel, concrete overpass on Hy. 7, F.A.P. 58-3-B, Brownwood, $40,000. L. Ehlinger, Box 210, Brownwood, resident engr.

CONTRACTS AWARDED

Mass., Quincy — New York, New Haven & Hartford R.R. Co., New Haven, Conn., E. E. Oviatt, ch. engr., at Room 270, South Station, Boston, removing grade crossing, to Tredennick Billings Co., 10 High St., Boston, $55,862.

N. Y., Bethlehem—Delaware & Hudson R.R. Co., J. MacMartin, ch. engr., Albany, Elsmere-Bethlehem Co. Hy., crossing of Delaware & Hudson R.R. tracks, to New England Constr. Co., Circuit Ave., West Springfield, Mass., $69,015. Noted July 10, 1929.

N. Y., Cayuga—Lehigh Valley R.R. Co., G. T. Hand, ch. engr., 143 Liberty St., New York, eliminating Dean Crossing, Schuyler Co., to M. R. Ingraham, Inc., 444 Bway., Albany, $74,874. Noted Feb. 5.

N. Y., Mexico—New York Central R.R. Co., F. B. Freeman, ch. engr., 466 Lexington Ave., New York, eliminating grade crossing on Mexico-Union Sq. state Hy., Mapleview Station, to William M. Ballard, Inc., City Bank Bldg., Syracuse, $53,439. Noted July 2.

DAMS

CONTRACTS AWARDED

Calif., Newport Beach—Bd. Comrs. Irvine Co., constructing dam 31.5 ft. high to impound 12,000 to 14,000 acre ft. spillway capacity 6,500 second ft., for caring for flood waters from El Modena to El Toro, to H. W. Rohl Co., 4351 Alhambra Ave., Los Angeles. Est. $195,000. No outlet conduit from dam, water pumped from reservoir and transmitted by 42 in. diam. pipe line back to valley, to be used for irrigation, booster pumping system. C. R. Browning, Newport Beach, engr.

PIERS AND WHARVES

BIDS ASKED

N. Y., Brooklyn—PIER, etc.—Sept. 4, by Bd. Transportation, 250 Hudson St., New York, new pier and piershed, incl. removal existing Pier 6 and dredging foot of Cranberry St., Agreement "G A."

AIRPORTS

PROPOSED WORK

Miss., Vicksburg—City Council airport, $75,000. A. G. Seiferd, Baton Rouge, engr.

Mo., Kansas City—City Council revised plans by A. H. Gentry, Fairfax Bldg., 1 story, 120 x 400 ft., hangar, 50 x 400 ft. lean-to, 40 x 120 ft. testing building, 2 story, 40 x 170 ft. office, rein.-con., steel, brick, at Municipal Airport, $250,000. Transcontinental & Western Air, Inc., lessee.

Tex., Brownsville — Pan-American Airways, Inc., c/o T. E. Gilmore, mgr., preliminary plans 2 steel standard airplane hangars. Engineer not appointed.

BIDS ASKED

Ill., Chicago—American Airways, Inc., Universal Div., Lambert-St. Louis Field, Robertson, Mo., bids about Sept. 3, 120 x 165 ft., concrete, brick, steel and joist hangar, 30 x 120 ft. lean-to. $90,000. Hoener, Baum & Froese, 3605 Laclede Ave., St. Louis, Mo., engrs.

CONTRACTS AWARDED

Mass., Natick—Natick-Wellesley Airport Co., H. M. Law, Worcester St., clearing site, constructing eight 2,000 ft. airplane runways, Owner builds. A. Eillertson, in charge of constr.; hangar, to Prigen Steel Building Co., 1 Carleton St., Cambridge.

GRAIN ELEVATORS

PROPOSED WORK

Ont., Windsor—GRAIN ELEVATOR—Windsor Elevator Co. Ltd., C. A. Dewhirst, County Bldgs., Sandwich, 2,000,000 bu. grain elevator, incl. 1,500 bu. per hr. corn dryer, on River Front.

POWER AND LIGHTING

PROPOSED WORK

Calif., Glendale—City Council, combination lighting and trolley standards in Brand Blvd. between Arden Blvd. and Southern Pacific Rd. $150,000.

Oklahoma—Oklahoma Gas & Electric Co., 321 North Harvey St., Oklahoma City, preliminary plans 14 mi. 13,000 volt electric transmission line from Oklahoma City to Newcastle. $25,000. Byllesby Eng. Co., 231 South LaSalle St., Chicago, Ill., engrs.

BIDS ASKED

Calif., San Francisco—See "Bridges."

S. D., Sioux Falls—See "Contracts Awarded."

CONTRACTS AWARDED

Ill., Pecatonica—Pecatonica Electric Co., c/o Central Illinois Electric & Gas Co., Rockford, gas distribution system, incl. 27,000 ft. 2 in. butt welded black steel and oxy-acetylene welded pipe, meters, meter piping, house services, regulators, also 8,000 ft. 2 in. feeder main from high pressure line of Central Illinois Electric & Gas Co., south of here, to United Engineers & Constructors, 112 West Broad St., Phila., $25,000.

New York—J. J. Dorman, comr. Fire Dpt., Municipal Bldg., New York, portion underground fire alarm system, Northern Blvd., Queens Boro, to J. T. Fitzgibbon, $27,488; portion underground fire alarm system (post manhole and conduit installation only), Bronx Boro, to Wm. T. Dippel Inc., 43-29 36th St., Long Island City, $7,444. Noted Aug. 12.

New York—Bd. Transportation, J. H. Delaney, chn., 250 Hudson St., New York, furnishing, installing telephone and emergency alarm equipment for portion of Independent System City-Owner Rapid Transit R.R., Manhattan, Brooklyn and Queens Boros, to W. H. Taverner, 41 East 57th St., New York, $159,237. Noted July 16.

S. D., Sioux Falls—Sioux Falls Gas Co., laying gas mains, greater part 16 in. to furnish natural gas to city, own forces. $200,000. Eng. Dpt. Missouri Valley Pipe Line Co., engrs.

PARKS AND SPORTS

PROPOSED WORK

Ind., Ft. Wayne—Bd. Park Comrs., park improvements. $210,000. W. Snyder, Ft. Wayne, secy.

Ia., Oskaloosa—Kiwanis and Rotary Clubs, T. J. Bray, chn. of com., preliminary plans rein.-con. swimming pool, bathhouse, C. D. Hutchins, secy.

Mass., Boston—City Park Dpt., 33 Beacon St., plans piling and reconstructing North End Playground at Charles River bank, $25,000 or more.

N. Y., Rockaway—Dpt. Parks, Arsenal Bldg., Central Park, New York, park development incl. landcaping, athletic field, tennis courts, also boardwalk $440,000, bulkheads $130,000, jetties $85,000, widening Washington Ave., $65,000, constructing Marginal Rd. $60,000, in Jacob Riis Park.

Que., Montreal—City, sketches by Ludger and Paul Lemieux, 1260 University St., public bath, St. Henry Ward.

Ont., Sandwich—Town, 80 x 110 ft., rein.-con. swimming pool, chlorinating and filtration equipment, showers, lockers to accommodate 500, $40,000. H. W. Patterson, Imperial Bldg., Walkerville, engr.

BIDS ASKED

N. J., Paterson—Bd. City Comrs., City Hall, bids about Sept. 15, rein.-con. municipal stadium, 7,500 seating capacity, Monument Heights. $100,000. Fanning & Shaw, 49 Ward St. engrs. Noted Aug. 6.

N. Y., Brooklyn—Sept. 10, by W. C. Martin, archt. and supt. School Buildings, Flatbush Ave. extension and Concord St., excavating, paving, fencing, sanitary work and drainage for playground, at P. S. 98, Avenue Z, East New York Ave., East 26th and 27th Sts., for Bd. Educ., 500 Park Ave., New York.

N. Y., New York—Sept. 8, by Dpt. Parks, W. R. Herrick, pres. Park Dpt., Arsenal Bldg., Central Park, reconstructing and paving road between Allerton Ave., at Bronx Park East and Bronx River Parkway, New York Botanical Gardens; reconstructing and improving walks system in New York Zoological Gardens; improving portion McComb's Dam Park extension, incl. wading pool, playgrounds.

Wash., Spokane—See "Contracts Awarded."

CONTRACTS AWARDED

Mass., Boston — Park Dpt., 33 Beacon St., grading, concrete bleachers, Dunbar Ave. near Boys' High School, Dorchester, to C. M. Callahan, 23 South Fairview St., Roslindale, $22,881. Noted Aug. 13.

Mo., St. Louis—Bd. P. Serv. 1 story, basement, 83 x 116 ft., brick, rein.-con. bath house, incl. 35 x 85 ft. swimming pool, lockers, to Woermann Constr. Co., 3800 West Pine Blvd., $68,090. Est. $83,500. Noted Mar. 26.

Nev., Reno—Coliseum Holding Co., c/o G. E. Koster, archt., Arcade Bldg., 1 story, brick, steel coliseum, incl. boxing arena, ice skating rink, basketball courts, West 2nd St., to W. K. Owen, 3145 Pleitner St., Fruitvale, Calif., $200,000. Noted July 2.

Wash., Spokane—City, improving 8 school playgrounds, public parks, safety crossings, miscellaneous work, day labor. $395,150 bond issue to be used for same.

HEATING AND VENTILATING

BIDS ASKED

Ia., Vinton—Sept. 8, by State Bd. Educ., State House, Des Moines, heating plant equipment for State School for Blind. $50,000. E. E. Cole, Dpt. Building Constr., Cedar Falls, engr.

Mass., Grafton—Commonwealth of Massachusetts, Dpt. Mental Diseases, Boston, taking bids renewing steam lines at State Hospital, $53,000. R. D. Kimball Co., 6 Beacon St., Boston, engrs. Noted Aug. 13.

N. Y., Albany—Sept. 24, by Commissioner Educ., Education Bldg., construction, heating, sanitary and electrical work for alterations of Gidson Hawley Buildings, New York State College for Teachers.

N. Y., New York—Sept. 9, by Bd. Higher Educ., at office Secretary Hunter College, Park Ave. and 68th St., heating and ventilating for gymnasium building, Hunter College, Bedford Park Blvd., Goulden, Jerome and Navy Aves.

N. Y., Sonyea—Sept. 16, by Commissioner State Capitol, Albany, heating work, replacing boilers, repairing heating system, 174th Infantry Armory.

N. Y., Comstock—Sept. 15, by Commissioner Correction, State Office Bldg., Albany, heating, new boiler, feed water pumps, at Great Meadow Prison.

N. Y., Comstock—Sept. 24, by Commissioner Correction at State Office Bldg., Albany, heating, sanitary and electrical work for garage, blacksmith and machine shop buildings, Great Meadow Prison.

N. Y., Fairmount—Sept. 16, by Commissioner Mental Hygiene, State Office Bldg., Albany, heating, sanitary and electrical work for assembly hall, Syracuse State School.

N. Y., Ithaca—Sept. 24, by Commissioner Educ., State Education Bldg., Albany, heating, sanitary and electrical work for agricultural economics buildings, New York State College of Agriculture, Cornell University.

N. Y., New York—Sept. 9, by Bd. Higher Educ., at office Secretary Hunter College, Park Ave. and 68th St., heating and ventilating work for gymnasium building, to be erected on site bounded by Bedford Park Blvd., Goulden and Navy Aves., Bronx Boro.

N. Y., Sonyea—Sept. 16, by Commissioner Mental Hygiene, State Office Bldg., Albany, heating, electrical work for service connections to bakery (tunnel) Craig Colony.

N. Y., Springville—Sept. 9, by Comr. Health, State Office Bldg., Albany, heating, sanitary and electrical work for animal house and laboratory, Institute for Study of Malignant Diseases; adv. E. N.-R. Sept. 3.

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Heating and Ventilating (Continued)

CONTRACTS AWARDED

N. Y., New York—See "Theatres."

N. Y., Rochester—Bd. Educ. heating and ventilating in Charlotte Junior High School, to Perdue & Gleockle, Inc., 65 Broad St., $119,747; electrical work, to Dwyer Electric Co., 213 Monroe Ave., $47,417; Indiana limestone, to G. Ittenbach, Rochester, $28,506. Grand total $195,670. Noted July 30, under "Schools."

UNCLASSIFIED

PROPOSED WORK

Calif., San Francisco—COMMUNITY CENTER—Jewish Community Center, plans by Hyman & Appleton, 68 Post St., 2 story, basement, rein.-con., California St. $650,000.

Calif., Los Angeles—TELEPHONE LINES—Bd. Comrs. Los Angeles Co., telephone line from Sierra Madre Dam to Sawpit Dam, incl. fabricating, erecting 26 A-frames, 6 wood poles, assemblying, erecting 10 steel poles, 100 anchors, 150 guys, 3,200 lb. place No. 6 wire 650 lb. place No. 9 wire. E. C. Eaton, Hall of Records Bldg., engr.

Wis., Chilton — GREENHOUSES — J. H. Kamps, two 25 x 100 ft. frick greenhouses, incl. furnaces, boilers, equipment. Private plans.

BIDS ASKED

N. Y., Elmira—ELEVATOR—Sept. 15, by Commissioner Correction, State Office Bldg., Albany, electric elevator, hospital building, New York State Reformatory.

N. Y., New York—BLOCK SIGNALLING, etc.—Sept. 25, by Bd. Transportation, 250 Hudson St., furnishing, installing block signaling and interlocking equipment for portion Independent System of City-owned Rapid Transit Railroads extending from 145th St., Manhattan Boro, to Webster Ave., Bronx Boro.

N. Y., Brooklyn—ELEVATOR—Sept. 10, by W. A. Martin, archt. and supt. School Buildings, Flatbush Ave. extension and Concord St., installing electrical passenger elevator, electric platform hoist in Brooklyn Technical High School, DeKalb Ave., from Fort Greene to South Elliott Pls., for Bd. Educ., 500 Park Ave., New York.

CONTRACTS AWARDED

Mass., Dorchester (br. Boston) — PIPING SYSTEM—Boston Elevated Ry. Co., Park Sq. Bldg., Boston, steam piping system, Park St. Car House, to J. S. Cassidy, 133 Austin St., Cambridge. Est. $25,000.

Mass., Everett — COKE CRUSHER UNIT — New England Fuel & Transportation Co., 250 Stuart St., Boston, 1 story, concrete coke crusher unit, Beacham St., to Koppers Constr. Co., Koppers Bldg., Pittsburgh, Pa. Est. $25,000.

Michigan — DOCK IMPROVEMENTS — State Hy. Dpt., Lansing, additional contract to dock, incl. drainage facilities, electrical conduit, concrete paving, sidewalks, curbing, guttering, Bl. of 16-11-22 C-7, Chippewa Co., to Lyons Constr. Co., Box 534, St. Ignace, $22,490 without cement.

N. Y., Flushing—COKE POCKET, etc.—New York & Queens Gas Co., 132-21 Roosevelt Ave., coke pocket, etc., Flushing River, Newtown, to Nicholson Co., 405 Lexington Ave., New York. Est. $40,000.

N. Y., New York — SPECIAL WORK — Bd. Transportation, J. H. Delaney, chn., 250 Hudson St., supply work (rails, frogs and switches) for Rapid Transit Railroads, Orders 58 and 59, to Lorain Steel Co., 350 5th Ave., $84,994. Noted Aug. 12.

O., Cleveland — GREENHOUSE, etc.—Syndicate, 1 story, 210 x 400 ft., concrete, steel, glass greenhouse and boiler house, North Elmstead St., to Chapman Constr. Co., Standard Banks Bldg. Est. $50,000.

Pennsylvania and New York—GAS PIPE LINE—Lycoming Natural Gas Co., Wellsboro, A. F. Robinson, engr., 110 ft. 20 in. steel pipe line, plain ends with Dresser couplings from Tioga County, Pa., to Syracuse, N. Y., to Booth & Flynn, 1942 Forbes St., Pittsburgh, Pa. Peoples Natural Gas Co., 545 William Penn Wy., Pittsburgh, lessor.

Pa., Phila.—BLOCK SIGNALLING and INTERLOCKING—Dpt. City Transit, C. E. Myers, dirt., City Hall Annex, Contr. 335, automatic block signalling and interlocking for Ridge 8th Street Subway, to Automatic Switch & Signal Co., Swissvale, $435,365. Noted Aug. 13.

Pa., Pittsburgh—LAND DEVELOPMENT—C. L. Woolbridge, Inc., Fulton Bldg., construct-ine one hundred and twenty-five 2 story houses, Mt. Washington, to W. F. Trimble & Sons, 1719 Pennsylvania Ave., for Buhl Foundation, C. F. Lewis, in charge, Farmers Bldg., $500,000.

Pa., Pittsburgh—MONUMENT—City, rebuilding soldiers' monument in West Park, North Side, to H. K. Veder & Sons, Inc., 43rd St. and A. V. R.R., $24,950.

Tex., Pioneer—OIL REFINERY—Concho Refinery Co., H. J. Earls, Box 745, San Angelo, oil refinery, $50,000. Owner builds. Owner wants quotations on complete laboratory equipment for 500 bbl. refinery.

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MATERIALS

BIDS ASKED

SNOW FENCE, STEEL POSTS, etc.—**Cherokee, Ia.**—Sept. 8, by Auditor Cherokee Co., 35,500 ft. snow force, four thousand six hundred 6½ ft. steel posts; also labor, moving, erecting 80 x 16 ft. high truss bridge on creosoted abutments. Address County Engineer or Auditor.

LUMBER, etc.—**Marshalltown, Ia.**—Sept. 8, at office Auditor Marshall Co., 14,693 b.f. creosoted lumber and posts, 35,928 b.f. untreated lumber. Address County Engineer or Auditor.

CAST IRON PIPE—**Bowling Green, Ky.**—Sept. 5, by City at office J. Q. Kirby, clk., up to 8 car loads American Waterworks Assn. Specifications 4, 6 and 8 in. B. and S. Class B c.i. pipe in 12 and 16 ft. lengths, f.o.b. Bowling Green. Prices by foot required.

LUMBER, etc.—**New York, N. Y.**—Sept. 11, by P. J. Dooling, comr. Purchase, Municipal Bldg., lumber and paving blocks to Dpt. Correction; electrical material and traffic control parts to Dpts. Correction, Plant & Structures and Police Dpt.

PIPE FITTINGS, etc.—**New York, N. Y.**—Sept. 9, by P. J. Dooling, comr. Municipal Bldg., pipe fittings, gages, lubricators and condensers tubes to Dpt. Plant & Structures, Water Supply, Gas & Electricity.

BROKEN STONE, etc.—**St. George, N. Y.**—Sept. 9, by J. A. Lynch, pres. Richmond Boro, Boro Hall, 500 cu.yd. ¾ in. broken stone, and 200 cu.yd. ¾ in. broken stone chips in Dist. 1.

STRUCTURAL STEEL—**Phila., Pa.**—Sept. 4, by C. E. Walsh, purch. agt. Pennsylvania R.R. Co., 15 North 32nd St., structural steel, Contr. 25, 1931.

CONTRACTS AWARDED

FIBRE CONDUIT—**Glendale, Calif.**—City, 50,000 ft. 4 in. and 40,000 ft. 4½ in. fibre conduit, to Graybar Electric Co., Inc., 301 East 8th St., Los Angeles, at $123.90 and $155.38 per 1,000 ft.

WATER PIPE—**Inglewood, Calif.**—O. H. Duelke, city clk., 2,600 ft. 8 in. and 1,100 ft. 12 in. c.i. pipe, to Utilities Equipment Corp., Ltd. (R. D. Wood & Co.), 110 North Alameda St, at $0.755 and $1.39 per ft. respectively.

WELL CASING—**Los Angeles, Calif.**—City Council, 2,000 joints, 8 gage, double stove pipe well casing for Water and Power Dpt. to Western Pipe & Steel Co., 5717 Santa Fe Ave., $13,350.

WATER PIPE FITTINGS, etc.—**Oakland, Calif.**—J. H. Kimball, secy. East Bay Municipal Utility Dist., furnishing, delivering 900 c.i. bell and spigot water pipe fittings, to Grinnell Co. of the Pacific 2230 Peralta Ave., Oakland, $3,120; 60,000 gal. steel water storage tank to Steel Tank & Pipe Co., 1100 4th St., Berkeley, $1,660. Noted July 16.

CAST IRON WATER PIPE—**San Bernardino, Calif.**—City Council, 2,200 ft. 20 in. Class 150 B and S c.i. water pipe ¼ in. 20 ft. lengths, to Utilities Equipment Corp. Ltd. (R. D. Wood Co.), 110 North Alameda St., Los Angeles, at $3.49 per ft.

EQUIPMENT

PROPOSED WORK

TRACTORS, TRUCK, etc.—**Oroville, Calif.**—Bd. Comrs. Butte Co. purchasing graders, caterpillar tractors, bulldozers, scarifier, rock crusher, motor truck. $41,453 budget appropriation. J. A. Baumgarner, Oroville, co. surv.

BIDS ASKED

DUMP TRUCK—**Oceanside, Calif.**—Sept. 8, by J. H. Landes, city clk., 1½- or 2-ton dump truck.

DUMP TRUCK—**San Gabriel, Calif.**—Sept. 8, by I. H. Stouffer, city clk., 1½-ton dump truck.

MOTORS and PUMP—**Crown Point, Ind.**—Sept. 8, by City Comrs., two 100 kw. Diesel driven motors and two 250 g.p.m. deep well pumps, for light plant. $33,000. Burns & McDonnell Eng. Co., 406 Interstate Bldg., Kansas City, Mo., engrs.

GATE VALVES—**Minneapolis, Minn.**—Sept. 8, by F. S. Gram, city purch. agt., one 48 in., two 36 in. one 30 in. gate valves. N. W. Risberg, city engr.

MOTOR PATROL—**Ortonville, Minn.**—Sept. 8, by O. E. Hahn, aud. Big Stone Co., motor patrol.

LIGHTING EQUIPMENT—**Mississippi**—Sept. 8, by State Hy. Comm., Jackson, electrical lighting equipment and installation on Biloxi Bay Bridge in Jackson and Harrison Counties. C. R. Williamson, dir.

CONCRETE MIXER—**Chesterfield, Mo.**—E. Mertz in market one-sack capacity concrete mixer with hoist.

PASSENGER CARS—**New York, N. Y.**—Sept. 25, by Bd. Transportation, J. H. Delaney, chn., 250 Hudson St., motors and control equipment for steel passenger cars for Independent System of City-owned Rapid Transit Railroads.

SIGN FRAMES—**New York, N. Y.**—Sept. 8, by S. Levy, pres. Manhattan Boro, Municipal Bldg., 700 street sign frames.

SHOP MACHINERY — **Bellfontaine, O.** — Sept. 8, by Bd. Educ., shop machinery for new high school.

DIESEL ENGINE—**Ford City, Pa.**—Bd. City Comrs. taking bids 500 kw. Diesel engine for municipal light and power plant. Burns & McDonnell Eng. Co., 406 Interstate Bldg., Kansas City, Mo., engrs.

SEWER CLEANING MACHINERY — **Durand, Wis.**—Common Council, A. C. Smith, city clk., in market sewer cleaning machinery.

PUMP—**Wausau, Wis.**—City, c/o City Clerk, in market electric pump for well of 60 ft. water bearing stratum on West St. Private plans.

FOREIGN

Mexico, Aguascalientes—Corn Products Refining Co., Mexico City, and 17 Battery Pl., New York, plant addition. $200,000. **Maturity in late fall.** Construction by subsidiary construction company, which will build by separate contracts and day labor.

Nicaragua—Standard Fruit & Steamship Co., Union Indemnity Bldg., New Orleans, La., plans constructing 50 mi. railroad and plantation work in Puerto Cabezas. **Maturity indefinite.** Some of work was commenced.

Union Socialist Soviet Republics—Commissar for Internal Supply, Soviet Russia, c/o Amtorg Trading Corp., 261 5th Ave., New York, plans meat packing plants and slaughter plants in Dnepropetrovsky, in Ukraine; Sverdolvosk, in Ural Region; Samara, in Middle Volga Region; Saratov, in Lower Volga Region; and in North Caucasus. To exceed $20,000,000. **Maturity after January.**

Commercial Buildings

RESIDENTIAL

BIDS ASKED

Me., Rumford—Sept. 8, by Rumford Building Assoc., c/o Coombs & Harriman, archts., 11 Lisbon St., Lewiston, 3 story, basement, mezzanine, brick, steel hotel, plain found., Hartford and Congress Sts. $150,000. Noted Aug. 27.

Mass., Brighton (sta. Boston)—See "Contracts Awarded."

N. J., Fort Lee—See "Contracts Awarded."

N. J., Hackensack—See "Contracts Awarded."

N. J., Kearny (sta. Arlington) — Verona Constr. Co., 60 Park Pl., New York, taking bids general contract 3 story, brick, steel, plain found., Belgrove Dr., corner Rose St. $150,000. Harris & Sohn, 17 Mechanic St., Newark, archts. Former bids rejected. Noted Aug. 27, under "Contracts Awarded."

N. J., Morristown—J. D. Allen, archt., 85 Harrison Ave., West Orange, taking bids general contract rebuilding 2 story, basement, 75 x 100 ft., brick, steel hotel, plain found., Morris and King Sts., recently destroyed by fire, for Nemark & Schlosser, c/o architect. $150,000. Former contract rescinded. Noted July 16, under "Contracts Awarded."

N. J., Perth Amboy — See "Contracts Awarded."

N. Y., Brooklyn—See "Contracts Awarded."

N. Y., Hempstead—See "Contracts Awarded."

N. Y., Long Island City — See "Contracts Awarded."

Pa., Pittsburgh—West Liberty Development Co., F. Behen, in charge, 73 Chatham St., bids about Sept. 15, 3 story, basement, 60 x 475 ft., brick, tile apartment, office, store, West Liberty Ave., Ray and Pauline Sts. C. J. and C. Rieger, 204 Clausner Bldg., archt.

CONTRACTS AWARDED

Calif., Oakland—L. J. Newton, 1130 1st Ave., 9 story, basement, rein.-con., to H. L. Peterson, 731 Treat Ave., San Francisco. $250,000. Noted July 9.

Mass., Brighton (sta. Boston) — Corporal Realty Co., c/o H. Joffe, 55 Lenark St., 4 story, basement, brick, steel, plain found., Commonwealth Ave., separate contracts. Est. exceeds $150,000.

Mo., St. Joseph—Robidoux Hotel Co., W. E. Downs, mgr., general contract remodeling 8 story, basement, incl. coffee shop, to Lehr Constr. Co., 2115 Frederick St., $56,000; heating and plumbing, to C. L. Kennedy, 813 Francis St., elevators, to Otis Elevator Co., 620 South 6th St. Est. $150,000.

N. J., Fort Lee—J. Fletcher Creamer & Son, 191 Main St., 3 story, basement, brick, steel apartment, garage, plain found., Lemoine Ave., separate contracts. $150,000. E. L. Wood, Englewood Cliffs, archt.

N. J., Hackensack—Kramer Constr. Co., Inc., 3010 Hudson Blvd., Jersey City, 3 story, basement, brick, steel, plain found., 208 Anderson St., separate contracts. $150,000. M. Kraut, 3010 Hudson Blvd., Jersey City, archt.

N. J., Perth Amboy—Philip & R. Aderman, 180 Brighton Ave., 3 story, basement, brick, steel, plain found., Gordon St., separate contracts. $160,000. C. Shilowitz, 26 Journal Sq., Jersey City, archt.

N. Y., Brooklyn—Beach View Development Co., 30 East 42nd St., New York, 6 story, 70 x 175 ft., Ada and Brightwater Courts, separate contracts. $250,000. Becker & Levy, 349 East 149th St., New York, archt.

N. Y., Brooklyn—Golden Painting & Building Corp., 330 Empire Blvd., 6 story, 90 x 100 ft., Kenmore Pl. and Avenue V, separate contracts. $150,000. J. Lubroth, 44 Court St., archt.

Buildings—Residential (Continued)

N. Y., Brooklyn—B. Mendnick, and One Thousand Five Hundred Seventy-Eight Carroll St. Corp., 1578 Carroll St., 6 story, 100 x 161 ft. apartment, West 4th and 65th Sts., separate contracts. $220,000. M. Rothstein, 186 Joralemon St., archt.

N. Y., Brooklyn—One Thousand Nine Hundred Twenty-Five Ocean Ave. Corp., S. Geller, pres., 1913 71st St., 6 story, 88 x 93 ft., Ocean and N Aves., separate contracts. $150,000. Kavy & Kavovitt, 350 Stone Ave., archts.

N. Y., Brooklyn — Pride Homes Corp., B. Roseblatt, pres., 1864 80th St., 2 story, East 35th St., Avenue P, separate contracts. $150,000. I. Kallich, 375 Fulton St., archt.

N. Y., Brooklyn—H. J. Spitzer, 16 Court St., 6 story, 64 x 200 ft., Brightwater Court and East 7th St., separate contracts. $250,000. B. W. Dorfman, 66 Court St., archt.

N. Y., Brooklyn—Worthwhile Homes, Inc., 906 5th St., 2 story, Remsen and Clarkson Aves., separate contracts. $150,000. J. Fein, 1773 Pitkin Ave., archt.

N. Y., Hempstead—Excelsior Lumber Co., Roosevelt, 6 story, Washington and Nicholas Sts., separate contracts. $250,000.

N. Y., Long Island City — Nichols Kenneth Holding Corp., 110 West 47th St., New York, 6 story, 75 x 125 ft., 48th St., Queens Blvd., separate contracts. $150,000. V. Schiller, 30-64 41st St., Astoria, archt.

N. Y., Long Island City — Hefgold Realty Corp., 1 East 44th St., New York, 2 buildings, 6 story, 104 x 142 ft., vicinity 43rd Ave. and 45th St., separate contracts. $500,000. B. Braunstein, 163 18th Jamaica Ave., Jamaica, archt.

N. Y., New York—Lojo Realty Corp. & L. Weisman, 1457 Boscobol Ave., Garden Apartments, 238 x 302 ft., Dongan Pl., separate contracts. To exceed $1,000,000. C. Kreymborg, 234 Marion Ave., archt.

Pa., Pittsburgh—See "Unclassified."

CLUBS

PROPOSED WORK

Calif., Sacramento—Y.W.C.A., 501 J St., plans by C. Dean, California State Life Bldg., 3 story, basement, rein.-con. club, 7th and N Sts. $150,000 or more.

Neb., Lincoln—Lincoln Y. W. C. A., c/o C. P. Peterson, pres. and M. F. Drake, genl. secy., plans by Meginnis & Schaumberg, 614 Federal Trust Bldg., and probably take bids at an early date 3 story, basement, 100 x 142 ft., rein.-con., brick, stone, terra cotta club, incl. swimming pool, gymnasium, cafeteria, 15th and N Sts. $200,000.

BIDS ASKED

Md., Baltimore — Sept. 4, by J. E. Sperry, archt., Calvert Bldg., 2 story, basement, 77 x 155 ft., concrete, brick clubhouse, Club Rd., for Baltimore Country Club, H. Boyce, 4 Club Rd. $225,000. Noted June 18.

CONTRACTS AWARDED

Pa., Johnstown—Masonic Temple Assn., G. R. Rose, pres., 306 Vine St., 3 story, basement, 109 x 125 ft., stone, steel, rein.-con., to Wilson Constr. Co., Schenkemeyer Bldg.; structural steel, to Griffith Constr. Co., 307 Bedford St.; cut stone, to Bloomington Limestone Co., Bloomington, Ind. Est. $300,000. Noted June 19.

HOSPITALS

PROPOSED WORK

Calif., Coronado—Coronado Emergency Hospital sketches 60 x 150 ft. hospital, 10th and C Ave.

Conn., Bridgeport — St. Vincent's Hospital, 2820 Main St., plans by E. G. Southey, 955 Main St., and takes bids probably in September, hospital, Main St. $500,000. Noted Aug. 7.

Conn., Waterford—Seaside Sanatorium State Tuberculosis Comn., Hartford, plans by Cass Gilbert, 244 Madison Ave., New York, sanatorium. $150,000. **Maturity in November.** Noted Aug. 20.

Md., Baltimore—University Hospital, Lombard and Greene Sts., plans by J. Evans Sperry, Calvert Bldg. and Smith & May, Baltimore Trust Bldg., 12 story, basement, concrete, brick, steel hospital, Redwood and Green Sts. $1,750,000.

Mass., Norfolk—Commonwealth of Massachusetts, Dpt. Correction, State House, Boston, plans by McLaughlin & Burr, 88 Tremont St., Boston, and soon takes bids brick farm buildings and laundry, plain founds., at State Prison Colony. $190,000 or more. R. D. Kimball Co., 6 Beacon St., Boston, engrs. Noted Feb. 19.

Minn., Minneapolis—Bd. P. Welfare, 361 City Hall, plans by Croft & Boerner, 1004 Marquette Ave., 4 story, basement, rein.-con., brick nurses' home at General Hospital, 6th Ave. and South 5th St. $200,000.

Mo., St. Louis—St. Johns Hospital, Mother Aloyius, superior, 307 South Euclid Ave., sketches by G. D. Barnett, 914 Syndicate Trust Bldg., 4 story, basement, 84 x 134 ft., rein.-con., brick, cut stone, terra cotta, Parkview east of Kings Highway.

Mo., St. Louis—St. Johns Hospital, c/o Mother Aloysious, Superior, 307 South Euclid Ave., probably take bids about Nov. 19, 4 story, basement, 84 x 134 ft., rein.-con., brick, cut-stone, terra cotta, Parkview east of Kingshighway. F. D. Barnett, 914 Syndicate Trust Bldg., archt.

N. J., Orange—Welfare Federation of the Oranges, 439 Main St., brick, steel addition to New Jersey Orthopedic Hospital and Dispensary, plain found. $150,000. **Maturity probably soon.**

N. J., Scotch Plains—Bd. Freeholders Union Co., Court House, sketches by Oakley & Son, 1259 Clinton Pl., 2 story, basement, brick, steel sanitarium at Bonnie Burn Sanitarium. $150,000.

N. Y., Neponsit Beach (mail Far Rockaway) —Dpt. Hospitals, Municipal Bldg., New York, plans by Dodge & Morrison, 160 Pearl St., 4 story, 35 x 125 ft. nurses home, 149th St. $250,000. Noted June 4.

N. Y., New York—Dpt. Hospitals, Municipal Bldg., plans by Landsman & Smith, 105 West 40th St., and takes bids probably in October, general contract 7 story maternity hospital, Welfare Island. Noted Aug. 20.

O., Cleveland—Parkwood Hospital Assn., J. E. Tuckerman, pres., 701 Parkwood Dr., plans by George S. Rider Co., engrs. and archts., Marshall Bldg., 5 story, basement, 40 x 117 ft. and 40 x 70 ft., concrete, brick, steel hospital addition. $650,000.

Que., Montreal—Bd. Governors Ste. Jeanne d'Arc Hospital, L. J. Tarte, pres., 501 Roslyn Ave., sketches by J. O. Marchand, 276 St. James St. W., and R. Simard, 927 Cherrier St., hospital addition, 110 Prince Arthur St., West Monfreal.

Que., Montreal—Civic and Provincial Govt. hospital in Maisonneuve Ward. $1,000,000. C. Houde, mayor.

BIDS ASKED

Calif., Redwood City — Sept. 16, by S. J. Hester, secy. Bd. P. Wks., Tubercular Preventorium at Pulgas Tunnel, for City of San Francisco and San Francisco Co. $150,000.

Conn., Willimantic—Sept. 10, by St. Joseph's Hospital, 88 Jackson St., altering 3 story, basement, brick hospital, nurses' home. Crow, Lewis & Wick, 200 5th Ave., New York, archts. Noted July 16.

Ind., Logansport—Oct. 1, by Comrs. Indiana Insane Hospital, 2 story, basement, 132 x 203 ft., rein.-con., brick, steel, marble, tile, bronze hospital. $225,000. W. Scholer, Lafayette, archt. Noted May 14.

Mass. Palmer—Sept. 10, by Commonwealth of Massachusetts, Dpt. Mental Diseases, brick, steel infirmary. $150,000. C. P. Hoyt, 8 Beacon St., Boston, archt.

CONTRACTS AWARDED

Calif., Los Angeles—H. L. Gilman, archt., 753 Kerchoff Bldg., 2 story, rein.-con. addition, to Myers Bros., 3407 San Fernando Rd., for Santa Fe Coast Lines Hospital, 610 South St. Louis St. $150,000. Noted Aug. 6.

Calif., San Francisco—D. J. Hester, secy. Bd. P. Wks., City Hall, granite work for Health Center Building, to McGillvray-Raymond Corp., 3 Poterero Ave., $124,735; brick work, tile partitions, to Larsen & Larsen, 629 Bryant St., $58,000. Noted Aug. 14.

Ind., Richmond—Bd. Comrs. Eastern Insane Hospital, general contract 2 story, basement, 136 x 218 ft., rein.-con., brick, to G. W. North Constr. Co., 9th and Tippecanoe Sts., Terra Haute; heating and plumbing to Freyn Bros., 102 North Illinois St., Indianapolis; electric wiring, to H. M. Stradling, 353 Massachusetts Ave., Indianapolis. Est. $250,000. Noted July 9.

Ia., Woodward—Bd. Comrs. Hospital for Epileptics and School for Feeble Minded, c/o Iowa State Bd. Control, E. H. Felton, chn., State House, Des Moines, general contract 2 story, basement, 3 story in center, rein.-con., brick hospital, school, to Buerkins & Buerkins, Quincy, Ill., $185,102, (incl. building at Cherokee); heating and plumbing in buildings in Woodward and Cherokee, to Carstens Bros., Ackley, $15,768.

Mass., Belmont — Commonwealth of Massachusetts, Dpt. Mental Diseases, State House, Boston, 1 story, basement, irregular sized brick, steel infirmary, plain found., State School Waverly Sect., to Klayman Constr. Co., 92 Hazelton St., Mattapan, est. $150,000; heating, to Lappn Bros., 8 Union St., Malden, plumbing, to Acme Heating & Ventilating Co., 13 Hawkins St., Malden, electrical work, to H. M. Haley Electric Co., 165 Pearl St., Boston, total est. $25,000. Noted Aug. 6.

Mass., Waverly — Commonwealth of Massachusetts, Dpt. Mental Diseases, State House, Boston, 1 story, basement, brick infirmary, Walter E. Fernald School, to Kleyman Constr. Co., 92 Hazelton St., Mattapan. Est. $150,000. Noted Aug. 6.

Mass., Westfield — Commonwealth of Massachusetts, Dpt. P. Health, 3 story, basement, brick, steel, employees building, plain found., to L. D. Phillips Constr. Co., 10 Main St. $150,000. Noted Apr. 16.

Mo., St. Louis — St. Louis University, R. Johnston, pres., 221 South Grand St., general contract Firmin Desloge Memorial Hospital, main building to be 14 story, basement, attic, 48 x 228 ft., 4 story, basement, 46 x 93 ft. sisters house, also laundry, employees buildings, 2 tunnels connecting with sisters house, tunnel under Grand Blvd. to connect with St. Louis University Medical School, to Hercules Contg. Co., Wainwright Bldg., on fee basis. Est. $1,850,000. Noted Dec. 25.

N. Y., Princess Bay (Sta. Staten Island)— W. H. Hoffman, archt., 26 Bay St., St. George, 2 story, basement, brick, steel nurses' home addition to J. Milnes, Richmond Ave., Port Richmond, for Richmond Memorial Hospital, 375 Prince Bay Rd. Est. $150,000. Contractor soon lets separate contracts. Noted Aug. 12.

Que., Montreal—Bd. Governors, St. Justine Hospital, J. Bernard, supt., 6055 St. Denis St., general contract 4 story, 105 x 125 ft. hospital service building, incl. two 31 x 50 ft. wings, rein.-con. brick, stone, St. Valier St., to Dansereau, Ltd., 1387 Bernard Ave., $170,300.

CHURCHES

PROPOSED WORK

Conn., Waterbury—By West Side Methodist Episcopal Church, R. F. Shinn, pastor, soon lets contract brick, stone, Myrtle St. $150,000. Bureau of Architects, 1701 Arch St., Phila., Pa., archts. Noted Aug. 13.

Me., Waterville—Christian Science Church, Waterville, plans by H. T. Muzzy, 173 Main St., 1 story, basement, brick, stone church. $150,000.

Mass., Boston—New Old South Church, F. D. Putnam, trustee, 1014 Statler Bldg., soon lets contract altering and constructing 3 story, basement, brick addition to parish house, Boylston and Dartmouth Sts. $150,000. Allen & Collens, 75 Newbury St., archts. Noted Aug. 6.

Mass., Wakefield—Lakeside Cemetery Corp., c/o E. M. Bridge, archt., 248 Boylston St., Boston, 1 story, basement, irregular shaped, brick, concrete, steel chapel, plain found., Lakeside Cemetery. $150,000.

Mass., Walpole—United Church of Walpole, L. C. Schroder, pastor, Main St., sketches 1 story basement, East St. $200,000. Architect not appointed.

N. J., Perth Amboy—St. Michael's Church, c/o G. W. Brooks, archt., 216 Smith St., 2 story, basement, brick, steel, plain found., Hull Ave. $200,000. Project abandoned. Noted July 23.

Neb., Omaha—St. Margaret Marys Roman Catholic Parish, c/o J. Mulvihill, Brandeis Theatre Bldg., chn. com., sketches rein.-con., stone church, 61st and Dodge Sts. $400,000.

N. J., Newark—Second Presbyterian Church, L. H. Clee, pastor, 294 Mount Prospect Ave., lets general contract early in October, rebuilding 2 story, basement, 80 x 120 ft., brick, steel, plain found., James and Washington Sts., recently destroyed by fire. $200,000. Bids in. W. B. Willis, 171 Madison Ave., New York, archt. Noted Aug. 6.

N. J., West New York—St. Peter and Paul Czechoslovak Lutheran Church, J. Zerman, pres., 67 26th St., Guttenberg, will not build 2 story, basement, brick, steel church. $150,000. Project abandoned. Architect not appointed. Noted Aug. 12.

R. I., Cumberland—Sisters of Mercy, c/o A. J. Murphy, archt., 25 Fenner St., Providence, sketches novitiate. $150,000 or more.

BIDS ASKED

Calif., Burlingame—E. Eames, archt., 353 Sacramento St., San Francisco, taking bids steel, concrete noviatiate and home for Roman Catholic Archbishop, 1100 Franklin St. $150,000 or more.

Calif., Los Angeles—Roman Catholic Archbishop, Selby and Ohio Sts., taking bids 1 story, basement, rein.-con. auditorium, Selby and Ohio Sts. $150,000. Newton & Murray, Architects Bldg., archts.

Calif., Los Angeles—H. Newton & R. Murray, Archt. Bldg., archts., taking bids rein.-con. auditorium, Selby St., for Roman Catholic Archbishop. $200,000.

N. H., Exeter—St. Michael's Roman Catholic Church, D. Cotter, pastor, taking bids 2 story, basement, brick, steel school, plain found. $150,000. J. J. O'Shaughnessy, 80 Boylston St., Boston, Mass., archt. Noted June 4.

Pa., Pittsburgh—J. L. Stuart, constr. supt., Oliver Bldg., taking bids on excavation and found. for 1 to 3 story, basement, granite, limestone Gothic type church, parish house, rectory, Pennsylvania St., Highland and Baum Aves., for East Liberty Presbyterian Church, C. A. Fisher, in charge building comn., 503 Highland Ave. Total $3,000,000. Cram & Ferguson, 248 Boylston St., Boston, archts. Noted June 4.

CONTRACTS AWARDED

Mass., Leominster—D. R. Baribault, archt., 1562 Main St., Springfield, 1 story, basement, brick, stone, plain found., to J. P. Keating, 58 Front St., Worcester, for St. Cecilia's Roman Catholic Church, J. Chicoine, pastor, 168 Mechanic St. Est. $150,000. Noted July 16.

Mass., Taunton—St. Marys Roman Catholic Church, J. J. Shay, pastor, altering and constructing 3 story basement, brick convent addition, plain found., to L. M. Witherell & Son, 29 Court St. Est. $150,000. Noted Aug. 12.

N. J., East Orange—Trinity Congregational Church, 26 Harrison St., altering and constructing 2 story, basement, brick, steel church addition, to W. F. Bowser, archt., 437 Main St., by separate contracts. $150,000. Noted Aug. 27.

N. J., Hawthorne — St. Anthonys Roman Catholic Church, W. E. Thompson, pastor, 286 Diamond Bridge Ave., 1 story, basement, 70 x 125 ft. church, to Hugh Montague & Son, Inc., 15 Exchange Pl., Jersey City. Est. $160,000. Noted June 18.

N. J., Jersey City—St. John's Roman Catholic Church, P. W. Smith, pastor, 3026 Hudson Blvd., general contract altering interior 2 story, basement, brick, steel church, to James Mitchell, Inc., 26 Journal Sq. Est. $150,000. Noted July 23.

Wis., Appleton — First English Lutheran Corp., F. C. Reuter, pastor, 326 North St., 160 x 180 ft., rein.-con., brick, stone church, North St. to Ford Constr. Co., 911 South Jackson St., Janesville. Est. $150,000.

SCHOOLS

PROPOSED WORK

Ark., Little Rock—University of Arkansas, Fayetteville, plans by H. R. Burks, Wallace Bldg., 5 story, 67 x 197 ft., rein.-con., stone medical building, 13th and McAlmont Sts. $275,000.

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Schools (Continued)

Calif., Bakersfield—City School Dist. sketches school buildings, incl. auditoriums, additions, on campus. $150,000 or more. Architect not appointed.

Calif., Berkeley—State of California, Sacramento, plans by C. Roeth, 1404 Franklin St., Oakland, rein.-con. primary school. $250,000.

Calif., Eldridge—State plans by Power & Ahnden, 605 Market St., San Francisco, 1 story, basement, rein.-con. addition, incl. gymnasium, ward building. $150,000.

Calif., Long Beach—City School Dist. plans by G. D. Riddle, Pacific Southwest Bldg., brick, concrete school. $150,000.

Calif., Los Angeles—City of Los Angeles School Dist. plans by W. Rochards, Architects Bldg., concrete, brick high school, 108th St. $150,000.

Calif., Pasadena—California Institute of Technology plans by Mayers Murray & Phillips and B. Goodhue, assoc. archts., 2 West 47th St., New York, 3 story, basement, sub-basement, rein.-con. addition to chemistry building. $400,000.

Calif., San Diego—State of California plans by W. H. Wheeler, California Bank Bldg., rein.-con. physical education building, science hall, store room. $200,000.

Conn., Portland—Town, W. H. Penfield, chn. Building Comn., receiving competitive plans Senior-Junior High School. $150,000. Architect not appointed.

Ky., Louisville—Selpician Fathers, c/o J. A. Floresch, bishop, 1118 South 3rd St., sketches seminary on 315 acre site, incl. sewers, waterworks. $1,000,000.

Mass., Chatham—Bd. Educ., E. B. Sampson, secy. School Bd., plans by McLaughlin & Burr, 88 Tremont St., Boston, 2 story, basement, brick, steel addition, incl. gymnasium, Main St. $200,000.

Mass., Hamden—Town plans by Towner & Sellew Associates, 329 Main St., Middletown, Conn., 1½ story school. $60,000. Noted July 9.

Mass., Taunton—Sacred Heart Roman Catholic Church, E. J. Moriarty, pastor, 29 1st St., sketches grade school. $150,000. Architect not appointed.

N. H., Hanover—Dartmouth College, A. Gooding, supt. Buildings, plans by J. F. Larson, Hanover, new physics unit. $150,000 or more.

N. J., Bayonne—Hudson Co. Parental School, 1241 Blvd., 2 story, basement, rbick, steel, chapel and garage, plain found., Boulevard. $150,000. **Maturity probably in October.** H. Ziegler, 26 Journal Sq., Jersey City, archt.

N. J., Bordentown—Dpt. Institutions & Agencies, W. J. Ellis, chn., State Office Bldg., Trenton, soon takes new bids various buildings at Industrial School for Colored Youth. $400,000. Former bids rejected. Noted July 30.

N. J., East Orange—Bd. Educ., 19 Winans St., revised sketches by Guilbert & Betelle, 20 Branford Pl., Newark, Junior High School, 2 story, basement, brick, stone, rein.-con., plain found., steam heating, North Clinton St. and Renshaw Ave. $350,000. Noted Aug. 6.

N. J., Elizabeth—Bd. Educ., 417 South Broad St., 3 story, basement, brick, steel manual training and industrial art school, plain found. $150,000. Architect not appointed.

N. J., Florham Park—Bd. Educ., R. H. Allen, pres., sketches by Rasmussen & Wayland, 30 West 47th St., New York, 2 story, basement, brick, steel, plain found. $150,000. **Maturity late October.**

N. J., Jersey City—Bd. Educ., Administration Bldg., Grade School, Replacement No. 10, 3 story, basement, brick, steel, rein.-con., plain found., Paterson Ave. $150,000 or more. Architect not appointed.

N. J., Jersey City—Bd. Educ., Administration Bldg., plans Senior High School, 4 story, basement, brick, rein.-con., steel, plain found., Hudson City Sect. $150,000. Architect not appointed. **Maturity soon.**

N. J., Jersey City—Bd. Educ., Administration Bldg., Grade School Replacement No. 7, 3 story, basement, brick, steel, plain found., Central Ave. $150,000 or more. **Maturity probably soon.** Architect not appointed.

N. J., Maywood—Bd. Educ., Municipal Bldg., 2 story, basement, brick, steel, plain found., 1 Maywood Ave. $150,000. Project in abeyance. G. F. Reeke, 221 Prospect Ave., archt. Noted Aug. 6.

N. J., Millburn — Bd. Educ., High School, sketches by E. Sibley & G. M. Cady, 1034 Edgewood Lane, Palisade, 2 story, basement, brick, steel school, plain found. $150,000.

N. J., Montclair—Bd. Educ. plans by Starrett & Van Vleck, 393 7th Ave., New York, Hillside School Addition. $150,000.

N. J., Morristown—Bd. Educ., O. M. Goble, dist. clk., 50 Early St., revised plans by C. C. Voorhees, 1 Schuyler Pl., 2 story, basement, brick, steel, rein.-con. school, plain found., Mills St. $200,000. Noted July 30.

N. J., Peapack — Bd. Educ., Peapack and Gladstone Boros, Main St., 2 story, basement, brick, steel school addition, plain found. $150,000. Project abandoned. A. Merchant, 1 Elm Row, New Brunswick, archt. Noted July 30.

N. J., Somerville—Bd. Educ., School 1, 2 story, basement, brick, steel high school, plain found. $150,000. Project in abeyance, may go ahead in October. Architect not appointed. Noted July 23.

N. J., Sussex — Bd. Educ., J. W. Wilson, clk., plans by Jacoby & Everett, Commonwealth Bldg., Allentown, Pa., 2 story, basement, brick, steel, rein.-con., plain found. $150,000.

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N. J., West New York—Bd. Educ. sketches by F. J. Ricker, 685 Hudson Ave., altering old building and constructing two 3 story, basement, brick, steel, rein.-con. wing additions on each side School 3, plain founds., incl. auditorium, 11th and Polk Sts. $200,000. Noted July 9.

N. J., West Orange—Bd. Educ., Northfield Ave., revised plans by Hacker & Hacker, 201 Main St., Fort Lee, and takes bids about Oct. 1, Junior High School, 3 story, basement, brick, steel, rein.-con., plain found., Gilbert St. $450,000.

N. J., West New York—Bd. Educ., Municipal Bldg., plans by F. J. Ricker, 685 Hudson Ave., altering and constructing 2 story, basement, brick, rein.-con., steel addition to School 3, 11th and Polk Sts. $150,000. **Maturity indefinite.**

N. Y., Brooklyn—School, c/o F. Murphy, pastor, 3624 Glenwood Rd., plans by McKenna & Irving, 15 Park Pl., New York, 2 story, 60 x 160 ft. school, Glenwood Rd. and East 38th St. $165,000.

N. Y., Brockport—Brockport Consolidated School Dist., new school. $450,000.

N. Y., Dongan Hills (sta. Staten Island)—Staten Island Academy, 70 Stuyvesant Pl., St. George, 2 story, basement, brick, steel school. $150,000. **Maturity in late fall.** Delano & Aldrich, 126 East 38th St., New York, archts. Noted July 16.

Pa., East Stroudsburg—Bd. Educ. sketches by Lacey & Rinker, Henry Bldg., Junior High School, 2 story, basement, brick, plain found. $150,000.

Pa., Muncy — Muncy Consolidated School Assn., plans by Lawrie & Green, 821 North 3rd St., Harrisburg, and bids early in fall, 2 story, part basement, brick, high school, plain found. $225,000.

Pa., Oil City—Bd. Educ., 312 Veach Bldg., sketches school buildings in different parts city. $600,000.

Pa., Throop (br. Scranton)—Bd. Educ., plans by L. M. Davis, Rehrig Bldg., Scranton, and bids early in fall 2 story, basement, rein.-con., brick high school, plain found. $200,000.

Vt., Middlebury — Middlebury College, P. Moody, pres., sketches by York & Sawyer, 100 East 42nd St., New York, college group, incl. library, dormitories and class units, $1,000,000; also sketches by Coolidge & Carlson, 89 State St., Boston, Mass., brick athletic unit, $500,000. Noted Aug. 6.

Ont., Toronto—W. H. Heaton, 443 Samsno Ave., soon takes bids school addition in East York Twp. $199,000.

T. H., Honolulu—Sisters of Sacred Heart, Honolulu, plans by L. E. Davis, Boston Bldg., 2 story, basement, rein.-con. convent. $150,000.

BIDS ASKED

Calif., Los Angeles—Sept. 11, by Regents University of California, 405 Hilgrade Ave., Westwood, Los Angeles, two 2 story, steel, concrete gymnasiums, one for women, other for men, on campus. $1,000,000. Noted Dec. 25.

Calif., San Francisco—H. A. Minton, archt., 525 Market St., taking new bids 4 story, basement, rein.-con. girls' home, Silver Ave. for Roman Catholic Archbishop, 1100 Franklin St. $200,000. Former bids rejected. Noted Aug. 27.

Del., Millville—Sept. 9, by State School Building Comn., H. V. Halloway, supt., Dover, 2 story, basement, brick, steel addition to Lord Baltimore School, plain found. $150,000. Guilbert & Betelle, 20 Bradford Pl., Newark, N. J., archts. Noted Aug. 20.

Mass., Boston—Sept. 11, by City Dpt. School Buildings, 2 story, basement, brick, steel school, plain found., Perham and Vermont St., Robert Gould Shaw Dist., West Roxbury. $200,000. Noted Aug. 20.

Neb., Omaha—Jan. 1, by J. L. Pachang, c/o Holy Cross Parish, 2 story, basement, 88 x 115 ft., brick, Bedford stone, terrazzo, rein.-con., steel school, incl. library, medical, music and rest rooms, concrete pile found., 48th and Woolworth Sts. $250,000. Lohr & Stengel, W.O.W. Bldg., archts.

N. J., Hillsdale—Bd. Educ., G. M. Strobsahl, dist. clk., bids about Oct. 1, Junior High School, 2 story, basement, brick, steel, Demarest Ave. $150,000. Hacker & Hacker, 201 Main St., Fort Lee, archts. Noted July 30.

N. J., Lodi—Bd. Educ., A. Cody, pres., Union St., bids about Dec. 1, general contract, plumbing, heating, electrical work, Junior and Senior High School, 3 story, basement, brick, rein.-con., steel, plain found., Westervelt Pl., 1st and Parker Sts. $350,000. F. Perrone, Midland Ave. Garfield, archt. Noted Aug. 6.

N. J., Mahwah—See "Contracts Awarded."

N. J., Middlebush—Bd. Educ., Franklin Twp., bids about Sept. 15, 2 story, basement, brick, rein.-con., steel school, plain found., West Side. $150,000. J. N. Pierson & Son, 198 Jefferson St., Perth Amboy, archts. Noted July 9.

N. J., New Brunswick—A. Merchant, archt., 1 Elm Row, bids about Dec. 1, general contract Soil Science Building, 2 story, basement, brick steel, plain found., State Experimental Farm, for Rutgers University, College Ave. $150,000. Noted Aug. 6.

N. J., Newton—Bd. Educ., bids about Oct. 1, Junior High School, 2 story, basement, brick, steel, rein.-con., plain found. $200,000. Hacker & Hacker, 201 Main St., Fort Lee, archt.

N. J., Teaneck—Bd. Educ., High School, bids about October, 2 story, basement, brick, rein.-con. school, plain found., Garrison Ave. $200,000. N. T. Anthony, 275 Eagle St., Englewood, archt. Smith & Ward, 100 East 42nd St., New York, assoc. archts. Noted Aug. 20.

N. J., Wilburtha—Sept. 2, by Dpt. Institutions & Agencies, State Office Bldg., Trenton, 2 story, basement, brick, steel training school and gymnasium, plain found., State Police Barracks. $150,000. Former bids rejected. Division Architecture & Constr., State Office Bldg., Trenton, archts. Noted July 23.

Pa., Phila.—E. L. Tilton, archt., 420 Lexington Ave., New York, bids about Nov. 1 or later from selected list of contractors, general contract, 1 story, basement, steel, marble, limestone library, plain found., Girard Ave. and Corinthian Aves., for Girard College, Girard Ave. $300,000.

Tenn., Knoxville—Sept. 15, by Bd. Comrs. State Bd. Educ., domestic arts and science buildings and agricultural building, for State A. and I. Normal College. $500,000.

Tex., Galveston—Bd. Educ. taking bids Junior High School, 3 story, rein.-con., brick, plain found. $325,000. R. R. Rapp, Guaranty Bldg., and Giesecke & Harris, Norwood Bldg., Austin, archts. Noted Aug. 20.

CONTRACTS AWARDED

Del., Marshalltown — Delaware School Foundation, DuPont Bldg., Wilmington, general contract Marshalltown Consolidated School, 2 story, basement, 80 x 220 ft., brick, steel, plain found., to R. S. Herzog, 10 South 18th St., Phila., Pa., $123,100, plumbing, heating and ventilating, to T. T. Weldin & Sons, 916 Orange St., Wilmington, $23,275; electrical work, to Arrow Electric Co., 5112 Whitby Ave., Phila., Pa., $4,490. Grand total $150,865. Noted July 23.

Ind., Valley Mills—School Comrs., 2 story, basement 64 x 196 ft., rein.-con., brick, incl. gymnasium, to R. W. Stephenson, Plainfield; heating, plumbing, to J. J. Barnhart, Wilkinson; electric wiring, to Skillman Electric Co., 619 North Illinois St., Indianapolis. Total est. $150,000. Noted June 26.

Mass., Belchertown—Commonwealth of Massachusetts, Dpt. Mental Diseases, State House, 2 story, basement, 30 x 140 ft. industrial school, 2 story, basement, 120 x 170 ft. school and gymnasium, 1 story, basement, 85 x 142 ft. nursery, brick, steel, to Central Eng. & Constr. Co., 210 Main St., Pawtucket, R. I. Est. exceeds $150,000. Noted July 30.

N. H., Bethlehem—Bethlehem School Dist., 2 story, basement, concrete, brick high and grade school, plain found., to W. H. Trumbull, Lebanon St., Hanover. Est. $150,00. Noted Aug. 13.

Mass., Taunton—St. Jacques Roman Catholic Parish, A. Leveque, pastor, 249 Whittenton St., altering and constructing 2 story, basement, brick, stone grade school addition, plain found., Whittenton St., to L. M. Witherell & Sons, 29 Court St. Est. $150,000.

N. H., Plymouth — State, E. L. Silver, Plymouth, brick, steel, stone addition to Samuel Reed Hall, to Davison & Swanburg, 61 Amherst St., Manchester. Est. $150,000. Noted June 4.

N. J., Mahwah—Bd. Educ., Hohokus Twp., E. T. Bennet, dist. clk., awarded separate contracts 1 story, basement, 80 x 140 ft. school. To exceed $150,000. Noted Aug. 12.

N. J., Mahwah—Bd. Educ., Hohokus Twp., E. I. Bennet, dist. clk., masonry contract 1 story, basement, 80 x 140 ft., brick, steel school, to North Bergen Constr. Co., 43 North 4th St., North Bergen; carpentry work, to B. Vandering, 132 3rd Ave., Hawthorne; plumbing, to C. Barto, Wyckoff. Bids Aug. 31, for heating and ventilating. Noted Aug. 27, under "Contracts Awarded."

N. J., Union—Bd. Educ., general contract 2 story, basement, brick, steel school, plain found., Milford Ave. and Lindy Terrace, to Auriemma & Macchi, 1765 Hudson Blvd., Jersey City, $164,143; plumbing, to N. F. Cantello, 23 Christine St., Elizabeth, $13,400; heating and ventilating, to J. Whorle, Inc., Tube Concourse Bldg., Jersey City, $26,000; electrical work, to Shaw Electric Co., 102 Central Ave., Newark, $10,263 steel and iron, to Hudson Structural Iron Wks., foot of Henderson St., Jersey City, $15,944. Grand total $229,750.

N. Y., Campbell—School Dist., general contract new central school, to Lowman Constr. Co., Elmira, $130,819; electrical work, to H. E. Rising, Corlad, $12,859; heating, to W. A. Walter, Rochester, $21,275; plumbing, to J. T. Sadler, 162 Lake St., Elmira, $9,365. Grand total $174,309.

O., Cincinnati—Crowe & Schulte, archts., 2436 Reading Rd., 4 story, basement, brick school, plain found., to M. J. Roche Constr. Co., 519 Main St., for University of Cincinnati, Clifton Ave., $293,282. Noted July 23.

Wis., Green Bay—Bd. Educ., W. W. Kelly, pres., plans by Foeller & Schober, 310 Pine St., 4 story, rein.-con., brick addition to Lincoln School, plain found. $150,000.

Que., Montreal — Roman Catholic School Comn., for Cherrier School, brick, steel, stone, concrete found., to St. George Constr. Co., 4820 4th Ave., $217,985.

THEATRES

PROPOSED WORK

Mass., Lawrence—Paramount Publix Theatres, lessee, Paramount Bldg., New York, plans by Rapp & Rapp, 1501 Bway., New York, theatre. Project in abeyance. Noted June 26.

Theaters (Continued)

Ont., East Windsor—Temple Theatre Ltd., c/o E. G. Hathway, theatre. $250,000.

BIDS ASKED

N. J., Red Bank—Boylan & Levine, archts., 143 Asbury St., New Brunswick, bids about Sept. 15, general contract 2 story, basement, rein.-con., brick, steel theatre, plain found., for Red Bank Amusement Co., c/o architects. $200,000. Noted July 16.

CONTRACTS AWARDED

Calif., Los Angeles—Fox-West Coast Theatres, Inc., 1909 West Washington St., rein.-con theatre, Compton Ave., to R. E. McKee, 108 West 6th St. $175,000.

N. J., Ridgewood—Warner Bros., 321 West 44th St., New York, excavation contract for 2 story, basement, 80 x 190 ft., brick, steel theater, plain found., Ridgewood Ave., to H. P. Wright & Co., 207 East 43rd St., New York. Noted July 23.

N. Y., New York—See "Stores."

N. Y., New York—Todd, Robertson & Todd Eng. Co., 347 Madison Ave., contractors, heating equipment, 120,000 c.i. radiators, etc., to American Radiator Co., 40 West 40th St.; steel and wrought iron pipe and conduit pipe for electrical wiring, to National Tube Co., 71 Bway., for Metropolitan Square Corp., 61 Bway. Contractors will let contracts early in September, general construction, some materials and services to be supplied on 66 story office building, music hall building and motion picture theater. Noted Aug. 19, under "Contracts Awarded."

BANKS

PROPOSED WORK

N. Y., New York—Bowery Savings Bank, 110 East 42nd St., bids about November, general contract altering and constructing bank and office addition, mechanical equipment, etc., $650,000. York & Sawyer, 100 East 42nd St., archts. Noted Aug. 20.

Pa., Easton—Lafayette Title & Trust Co. plans by Ritter & Shay, Packard Bldg., Phila., 3 story, basement bank.

BIDS ASKED

Kan., Topeka—Sept. 8 (extended date), by National Bank of Topeka, C. W. McKeen, pres., 14 story, basement, 75 x 115 ft. (157 ft. high) rein.-con., steel, stone bank, office, 6th St. and Kansas Ave. $500,000. T. W. Williamson & Co., 312 Farmers Natl. Bank Bldg., and K. M. Vitzhum & Co., 1 North La Salle St., Chicago, Ill., assoc. archts. Noted Aug. 27.

CONTRACTS AWARDED

N. Y., New York—Fifth Avenue Bank of New York, 530 5th Ave., 4 story, basement, sub-basement bank, 909 Madison Ave., to J. J. Downey, 410 West 34th St. Est. $150,000. Noted Aug. 20.

OFFICES

PROPOSED WORK

N. J., Newark—Owner, c/o J. B. Acocella, archt., 9 Clinton St., sketches 2 story, basement, brick, steel office, store. $150,000.

N. Y., New York — R. Manowaski, Hotel Roosevelt, 45th St. and Madison Ave., plans by Jardine, Murdock & Wright, 347 Madison Ave., office, 441 5th Ave. Project in abeyance until Jan. 1. Noted Apr. 16.

O., Steubenville—Ohio Power Co., Mellett Bldg., Canton, plans by F. H. Clarke, Steubenville, 3 story, basement, 50 x 90 ft., concrete, brick, steel, stone office, 5th and Washington Sts. $200,000.

BIDS ASKED

N. J., East Orange—Warren & Warren, archts., 31 Clinton St., Newark, bids about Sept. 15, general contract 2 story, basement, brick, steel, office ,store, plain found., Central Ave., for Owner, c/o Architects. $150,000. Noted Aug. 20.

CONTRACTS AWARDED

N. Y., New York—See "Stores."

Wis., West Allis—Allis Chalmers Co., Allis Chalmers, 5 story, 60 x 115 ft., brick, steel, concrete office building, Greenfield St., to Meredith Bros., 121 East Washington St., Milwaukee.

STORES

PROPOSED WORK

Calif., Los Angeles—W. H. Leimert Co., 532 West 6th St., plans by G. J. Adams, 5514 Wilshire Blvd., 3 story, basement, rein.-con. department store, Leimert Park. $150,000.

Mass., Brockton—F. W. Woolworth Co., Park Sq. Bldg., Boston, soon lets contract 3 story, basement, brick, steel store, office, plain found., 156-160 Main St. $150,000. Private plans. Noted Aug. 20.

Mass., Worcester—Owner, c/o J. P. Chebemanian, 9 Courtland St., sketches store, incl. apartments, Main St. $150,000. Architect not appointed.

Mich., Detroit—Sears Roebuck & Co., Grand River Ave., rein.-con., brick, steel addition, plain found., Grand River and Gratiot Aves. $300,000. Private plans.

N. J., Jersey City—Owner, c/o Mahnken & Schultz, archts., 26 Journal Sq., 2 story, basement, brick, steel store, office, plain found. $150,000. Project abandoned. Noted Aug. 12.

Wis., Manitowoc—S. Borris, 908 South 18th St., 3 and 5 story, 60 x 125 ft., brick, steel, Brault, 1922 Madison St., Two Rivers, archt.

BIDS ASKED

N. Y., New York—See "Contracts Awarded."

CONTRACTS AWARDED

Ind., Indianapolis—Sears, Roebuck & Co., Arthington and Homan Sts., Chicago, Ill., 3 story, 50 x 194 ft. (38,500 sq.ft. floor space) addition to department store, to W. P. Jungclaus Co., 825 Massachusetts Ave. Est. $175,000. Noted Aug. 27.

Md., Baltimore—J. E. Sperry, archt., Calvert Bldg., 5 story, basement, mezzanine, 98 x 112 ft., brick limestone, granite, steel store addition, North Howard St., to Consolidated Eng. Co., 20 East Franklin St., Baltimore, $250,000. Noted Aug. 20.

N. Y., New York—Westbuhre Construction Co., c/o B. Levenson, 349 East 149th St., 136 x 262 ft. store, office, theatre, Westchester and Pilgrim Aves., separate contracts. $150,000. **Maturity indefinite.** W. Shary, 22 East 17th St., archt.

Pa., Pittsburgh—R. M. Trimble, archt., Commonwealth Bldg. Annex, 5 story, basement, 45 x 190 ft., brick, steel store, to Landau Bros. Co., 125 1st Ave., for Richman Bros. Co., 1600 1st Ave. Est. $250,000. Noted Aug. 14.

PUBLIC

PROPOSED WORK

Mass., Springfield — HOME — City, D. R. Winter, mayor, City Hall, sketches city home, $150,000 or more. Architect not appointed.

N. J., Bayonne — FIRE ALARM, etc. — Bd. City Comrs., City Hall, 2 story, basement, fire and police alarm building headquarters, brick, steel plain found. $150,000. Project abandoned. L. Quien, Jr., 229 Broad St., Elizabeth, archt. Noted July 16.

N. J., Bayonne — MUNICIPAL — Bd. City Comrs., W. P. Lee, clk., City Hall, 4 story, basement, brick, steel, plain found. Avenue C between 27th and 28th Sts. $150,000. Project in abeyance, may go ahead in spring, 1932. P. A. Vivarttas, 110 48th St., Union City, archt. Noted Aug. 12.

N. J., Elizabeth—CITY HALL, etc.—Bd. City Comrs., City Hall, revised sketches by Oakley & Son, 1259 Clinton Pl., city hall and municipal building, plain found. $150,000 or more Noted July 9.

N. J., Hillside — FIRE HOUSE — Township Comm., Administration Bldg., brick, steel, Ramsey and Sweetland Sts. $150,000. **Maturity probably soon.** Architect not appointed.

N. J., West Orange — TOWN HALL — Bd. Council, R. C. Alford, town clk., Town Hall, 2 story, basement, brick, steel, rein.-con., plain found. $150,000. **Maturity probably soon.** Architect not appointed.

Ont., Ottawa—PUBLIC—Dpt. P. Wks. plans by T. W. Fuller, ch, archt. Architectural Staff, new public building, Wellington St. $5,000,000.

BIDS ASKED

Conn., Newton—LIBRARY—Sept. 4, by Town, C. H. Booth Memorial Library, 2 story, basement, concrete, brick, steel, plain found., Main St. $200,000. O. N. Sunderland, 248 Main St., Danbury, archt. Noted Aug. 27.

Mass., Cambridge—COURT HOUSE—Sept. 4, by Middlesex Co., W. C. Bardwell, chn., Court House, 3 and 4 story, basement, brick, steel, plain found., 3rd and Spring Sts. $200,000. C. R. Greco, 11 Beacon St., Boston, archt. Noted Aug. 27.

Mass., Springfield—MUSEUM—Sept. 15, by Gray Art Museum and City Library Assn. (from selected list of bidders), general contract art museum, State and Chestnut Sts. $350,000. E. L. Tilton, 420 Lexington Ave., New York, archt. Noted June 18.

Mass., Springfield — NATURAL HISTORY MUSEUM—Sept. 15, by City Library Assn., natural history museum. $160,000. E. L. Tilton, 420 Lexington Ave., New York, archt. Noted June 18.

N. J., Hackensack — ADMINISTRATION — Sept. 8, by Bd. Freeholders Bergen Co., Court House, constructing administration building. Former bids rejected. Noted May 28.

N. J., Jersey City—ARMORY—Sept. 9, by State Military Bd., A. Hill, in charge Quartermaster General Office, Trenton, 4 story, basement, 225 x 320 ft., brick, steel, rein.-con., Montgomery St., Jordon and Summit Aves. $1,000,000. O. Hunt, Hunt Bldg., Trenton, archt. H. A. Kelly, 921 Bergen Ave., assoc. archt. Noted Sept. 3.

N. Y., Thiells—FARM BARNS, etc.—Sept. 23, by Commissioner Mental Hygiene, State Office Bldg., Albany, farm barns, incl. heating, sanitary work and electrical work also dormitory and dairy building, at Letchworth Village.

S. D., Pierre—CAPITOL—Sept. 10, by State, Capitol Building Comns., 4 story, basement, 66 x 144 ft., rein.-con., steel, Bedford limestone addition, 30,000 sq.ft. floor space. $280,000.

CONTRACTS AWARDED

Mass., Gloucester — FIRE STATION — City, Fire Dpt., 2 story, basement, brick, stone, steel, plain found., to Palelli & Hunt, 6 Andrews St., Gloucester. Est. $150,000. Noted Apr. 9.

Neb., Lincoln — MUNICIPAL — City, T. H. Berg, clk., 3 story, basement, 93 x 192 ft., rein.-con., stone, brick, to Olson Constr. Co., 704 Stuart Bldg., $112,950. Noted Aug. 19.

Okla., Tulsa—FIRE ALARM STATION and GARAGE—City Comn., E. Logan, aud., 1 story, basement, 60 x 72 ft., rein.-con., brick fire alarm building, plain found., also 1 story, basement, 38 x 65 ft. garage, to S. R. Smith Constr. Co., 703 West 2nd St., $55,243. Total est., $200,000. Contracts later on equipment. Noted Aug. 14.

UNCLASSIFIED

PROPOSED WORK

Conn., New London—HOME—Smith Memorial Home, 29 Masonic Ave., sketches home, $150,000. Architect not appointed.

Ill., Chicago—EXPOSITION—General Motors Inc., General Motors Bldg., Detroit Mich., sketches by Albert Hahn, Inc., 1000 Marquette Bldg., Detroit, Mich., concrete, brick, steel, Lake Shore and 31st St. $1,000,000.

Md., Baltimore—HOME—Tall Cedars Building Corp., c/o W. G. Beecher, archt., 12 East Pleasant St., 2 story, basement, concrete brick, steel 1207-15 North Charles St. $200,000.

N. J., Elizabeth — MAUSOLEUM — Corporation, c/o F. A. Reed, archt., 1221 East Grand St., 1 story, basement, brick, steel, granite, plain found. $150,000. Project in abeyance. Noted Aug. 6.

N. J., Princeton—LABORATORY—Rockefeller Institute, York Ave. and 66th St., New York, sketches by Coolidge, Shepley, Bulfinch & Abbott, Ames Bldg., Boston, Mass., laboratory of animal and plant pathology. To exceed $150,000.

BIDS ASKED

N. J., Morristown—PROFESSIONAL, etc.—W. E. Lehman, archt., 972 Broad St., Newark, taking bids general contract 2 story, basement, 70 x 135 ft., brick, steel, field stone, professional building and stores, plain found., South and Pine Sts., for Stamelman Realty Co., c/o Architect.

CONTRACTS AWARDED

Mo., St. Louis—STATION—Midwest Industrial Development Co., subsidiary Illinois Terminal R.R. Co., A. P. Titus, vice pres., 1221 Locust St., wrecking 10 story building at 12th St. and Washington Ave. to make way for new station, to Merker & Co., 317 North 11th St. Noted Aug. 13.

Tex., San Antonio — EXCHANGE—Southwestern Bell Telephone Co., 11th and Pine Sts., St. Louis, Mo., 2 story, basement, 68 x 70 ft., rein.-con., brick, stone, Fredericksburg Rd., Warner and West Huisache Sts., to H. E. Wattinger, Austin; plumbing, to A. H. Shafer, 829 North St. Marys St.; heating, to F. C. Wangler, 120 Natalen St., electrical work, to Graham & Collins, 801 Main St. Est. $150,000. Noted July 30.

Industrial Buildings

FACTORIES AND MILLS

PROPOSED WORK

Calif., Anaheim—FACTORY—Schofield Automotive Eng. Co., Inc., plans by A. Curlett, Union Bank Bldg., Los Angeles, 2 story factory. Est. exceeds $40,000.

Calif., Bay Point—FACTORY—Congoleum-Nairn, Inc., Kearny, N. J., plans by Sanderson & Porter, L. Montgomery St., San Francisco, factory, felt base floor covering. $1,500,000.

Calif., San Francisco—PAINT SHOP, etc.—See "Warehouses."

Georgia—PAPER and PULP MILL—State Dpt. Forestry & Geological Development, Capitol Bldg., Atlanta, experimental and commercial paper and pulp mill. $70,000. **Maturity soon.** Chas. H. Herty, 101 Park Ave., New York, engr.

Ill., Anna—SHOE FACTORY—International Shoe Co., 1501 Washington Ave., St. Louis, Mo., sketches rein.-con., brick factory. Private plans.

Ia., Dubuque—BAKERY—Trausch Bakery Co., J. P. Trausch, pres., 1130 Iowa St., sketches rein.-con., brick, Main St., near Jones St. $60,000.

Mass., Provincetown—PLANT — Northern Gas Utilities Co., Inc., 15 Congress St., Boston, sketches by G. H. Stevens, 141 Milk St., Boston, brick gas plant. $70,000.

Mo., Windsor—SHOE FACTORY — International Shoe Co., 1501 Washington Ave., St. Louis, soon lets contract 3 story, brick, concrete, 40,000 sq.ft. floor space. $80,000.

N. J., Bloomfield—FACTORY—General Electric Co., Lawrence St., 1 story, basement, brick, steel addition, plain found. $40,000. Private plans. **Maturity indefinite.** Noted July 16.

N. Y., Bolivar—OIL REFINERY—Alleghany Refining Co., 1,000 bbl. oil refinery. Project in abeyance until November or later. Noted June 25.

N. Y., Brooklyn — LAUNDRY — K. N. K. Laundry, C. Batelotti, pres., 62nd St. and West 12th Ave., plans by A. Goldberg, 164 Montague St., altering laundry, 61st St. and West 12th Ave. $40,000.

N. Y., Brooklyn—FACTORY and STORAGE—M. J. Tatarsky, c/o M. Klein, archt., 65 Court St., New York, 4 story, brick, 253-261 McKibbin St. $150,000.

N. Y., Dunkirk—BULK OIL DISTRIBUTING PLANT—Standard Oil Co. of New York, 26

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Factories and Mills (Continued)

Bway., New York, bulk oil distributing plant. $300,000. **Maturity late in fall.** Private plans.

N. Y., New York — FACTORY — National Screen Serv., Inc., 126 West 46th St., lets contract about October, factory, office, 346 West 40th St. $250,000. Berlinger & Kaufman, 232 Madison Ave., archt. Noted Aug. 6.

N. Y., Port Richmond—LAUNDRY—Pal-Birn Steam Laundry, J. Palladino, pres., 89 Jewett Ave., plans by M. G. Uslan, 57 Bay St., St. George, laundry addition. $40,000. **Maturity late in October.** Noted Aug. 20.

Pa., Phila.—MANUFACTURING—Consolidated Cigar Co., Randolph and Jefferson Sts., plans by J. S. Simsohn, 933 North Broad St., 6 story, basement, 11th and Wharton Sts.

S. C., Spartanburg—MILL—Hudson Mills, F. Seifart, in charge, hosiery mill addition, Brevard St. $100,000. **Maturity in winter.**

Tex., Goose Creek—CEMENT PLANTS—National Cement Co., sketches cement milling plants. $50,000.

Tex., Jasper — CRATE FACTORY — Jasper Veneering & Mfg. Co., Jasper, crate factory. $45,000. Private plans.

Tex., Port Neches—COTTON MILL—Caroline Cotton Mills, cotton mill plant on Beaumont Ship Channel, near here. $250,000. Noted Aug. 20.

Tex., Sheldon—WOOD DISTILLING PLANT—B. N. Garrett, Sheldon, wood distilling plant. Private plans. Wants quotations from manufacturers or dealers complete machinery and supplies.

Wis., Menasha—PLANT—Appleton Engraving Co., 348 West Water St., plans by Le Vie & Gmeiner, 601 West College Ave., 2 story, 60 x 150 ft., brick, rein.-con., plain found., Water St. $40,000.

BIDS ASKED

Calif., Los Angeles—PLANT—Stauffer Chemical Co., Rives-Strong Bldg., taking bids 1 story, 100 x 160 ft. plant, Wilmington Ave. $50,000.

Conn., Hartford—SERVICE — International Harvester Co., North Main St., taking bids 1 story, 80 x 260 ft., brick, steel, timber sales and service building. $75,000. Private plans.

Mass., Brighton—BAKERY and GARAGE—Dorothy Muriel's Food Shops, 1368 Beacon St., taking bids 1 and 2 story, brick, concrete, plain found., Everett St. $40,000. A. J. Halfenstine, 129 Washington St., Brookline, archt.

N. J., Bogota—INDUSTRIAL——See "Contracts Awarded."

N. J., Burlington—BULK PLANT—Standard Oil Development Co., (C. H. Haupt in charge), engrs. and archts., Brunswick Ave., Linden, taking new bids 2 story basement, 60 x 95 ft., 1 story, basement, 20 x 30 ft. and two 40 x 40 ft. brick, steel buildings, plain founds., for Standard Oil Co. of New Jersey, 185 Washington St., Newark. $150,000. Noted July 23.

N. J., Wallington—BAKERY PLANT, etc.—Sept. 10, by J. T. Camlet, archt., 26 Piaget Ave., Clifton, 2 story, 75 x 75 ft., brick, steel bakery plant, store, garage, Wallington Ave. and Mercer St., for J. Boruta, 103 Halstead St. $40,000. Noted July 30.

N. Y., New York—FACTORY—Kohler & Campbell, 601 West 50th St., taking bids altering factory, and elevator shaft, 627 West 50th St. To exceed $40,000. Ross & McNeil, 274 Madison Ave., archts. Noted Aug. 12.

CONTRACTS AWARDED

Calif., South San Francisco—PLANT—Pacific Bone Coal & Fertilizer Co., Financial Center Bldg., San Francisco, general contract brick, rein.-con. addition to Austin & Co., Russ Bldg., San Francisco; wood piling, to Duncanson-Harrelson Co., De Young Bldg., San Francisco. Est. $100,000.

Ill., Bellewood—FACTORY—Jefferson Electric Co., 15th and Laflin Sts., Chicago, 1 and 2 story, 325 x 650 ft., rein.-con., brick, to Austin Co., 510 North Dearborn St., Chicago, and 16111 Euclid Ave., Cleveland, O. Est. $550,000.

Ind., Auburn—FACTORY—Messenger Corp., general contract 1 story, 100 x 144 ft., rein.-con., brick, steel, to W. Liege, Auburn. Est. $40,000.

Mass., Attleboro—FACTORY—L. G. Balfour Co., 27 County St., 3 story, basement jewelry factory and power plant, brick, plain found., Sect. 1, to H. F. Lull, Main St., Pawtucket, R. I.; Sect. 2, to H. O. Maskinnon & Co., 38 Emory St. $200,000.

Mass., Falmouth—BAKERY—A. G. Cooke, Main St., 1 story, basement, brick bakery, plain found., Main St., to Brooks-Skinner Co., Inc., 662 Adams St., Quincy. Est. $40,000. Noted Aug. 13.

N. J., Bogota — INDUSTRIAL — G. M. Brewster & Son, 253 West Fort Lee Rd., Bogota, 1 and 2 story, basement, brick, steel, rein.-con., separate contracts. $40,000. F. L. Smith, 21 East 40th St., New York, archt. and engr. Owner will buy conveyors, elevators, machinery, steel stacks, concrete coal pockets, sewers, septic tanks, etc. Noted July 23.

N. J., Newark—REPAIR DEPARTMENT—Bd. City Comrs., City Hall, altering and constructing 2 story, basement, 30 x 130 x 190 ft., brick, steel, rein.-con. auto service repair shop and garage addition, plain found., to T. Gallo, 242 Madison Ave., Irvington. $214,317; plumbing, to J. F. Smith, 81 Monticello Ave., $11,200; heating and ventilating, to Newark Heating Co., 131 South 12th St., $22,222; electrical work, to K. W. Electric Co., Inc., 49 Lawrence St., $16,545; steel and iron, to Breen Iron Wks., Inc., 272 Badger Ave., $49,800; sprinkler system, to Automatic Sprinkler Corp. of America, 1 Park Ave., New York, $5,463; oil burner, to Safety Service Institute, 48 William St., $15,435. Grand total $334,982. Noted Aug. 20.

Pa., Altoona—DAIRY—The McCormick Co., archts., 121-27 South Negley Ave., Pittsburgh, 2 story, 75 x 98 ft., brick, concrete, to J. C. Orr & Son, Altoona, for J. E. Harshbarger, 406 24th St. Est. $150,000. Noted July 30.

Tex., Mission—PACKING PLANT—L. E. Snavely, 1 story, 60 x 90 ft., rein.-con., brick, plain found., to Hidalgo County Lumber Co., Mission, $35,000. **Noted May 7.**

Wis., Appleton — NEWSPAPER PLANT—Appleton Post Crescent, 2 story, basement, 83 x 110 ft., concrete, brick, to Topager Constr. Co., Albert Lea, Minn., $63,293; heating and ventilating, to J. A. Engel Heating Co., Appleton, $8,200.

GARAGES

PROPOSED WORK

Calif., San Francisco—See "Warehouses."

Ill., Chicago—Firestone Tire & Rubber Co., 1278 South Main St., Akron, O., soon lets contract 3 story branch office and service building, Wabash Ave. and 16th St. $350,000.

N. Y., Brooklyn—Dpt. Hospitals, Municipal Bldg., New York, sketches by LeR. P. Ward, 205 East 42nd St., New York, repair shop and service building, Kings Co. Hospital to exceed $40,000.

N. Y., Brooklyn—B. Finkel, 1936 78th St., plans by M. J. Ort, 424 East 149th St., New York, service garage, Utica Ave. and Lenox Rd. $50,000.

N. Y., Brooklyn — A. Panosa, c/o A. H. Schwartz, 90 John St., New York, sketches by O. Goldschlag, 55 West 42nd St., New York, service garage, Gravesend Ave. and Avenue O. $40,000.

N. Y., New York—Lebanon National Kosher Sausage Factory, 224 East 6th St., J. Altman, pres., awards contract in September from bids of selected list contractors, garage and storage, West Farms Rd. and 173rd St.

N. Y., New York—Two Hundred Twenty West 61st Street Corp., L. Irish, 60 East 42nd St., revised plans by F. S. Parker, 119 West 57th St., 100 x 250 ft. service garage, 218 West 61st St. $75,000. Noted June 25.

BIDS ASKED

Mass., Brighton (sta. Boston)—City of Boston Dpt. P. Buildings, taking bids 1 story, concrete garage, concrete found., for Police Station 14. $40,000. J. M. Gray, 175 High St., Boston, archt. Noted Aug. 20 Daily.

CONTRACTS AWARDED

Mass., Medford—Boston Elevated Ry. Co., 31 St. James St., Boston, found. for 1 story, 65 x 155 ft., brick, steel, concrete garage, to J. Slotnik Co., 199 Washington St., Boston. Total est. $50,000. Noted Aug. 27.

Mass., Salem—C. E. Hall & Sons, Inc., 60 North Cross St., Somerville, 1 story, brick, steel garage, plain found., Canal St. Extension, to Wm. T. Reed Co., 89 Broad St., Boston. Est., $40,000.

N. Y., Syracuse — Niagara Hudson Power Corp., 3 story, 103 x 227 ft. garage, Wallace St., to Dawson Bros., Union Bldg., $200,000. Noted Feb. 12.

SHOPS AND FOUNDRIES

PROPOSED WORK

N. Y., Brooklyn—Dpt. Hospitals, City of New York, Kings Co. Hospital, plans by L. P. Ward, 205 East 42nd St., New York, and takes bids in February for general contract, 1 story, auto and truck repair shop and garage, New York Ave. and Clarkson St. $100,000. Noted Mar. 12.

BIDS ASKED

Mass., New Bedford—SHOP—M. C. Austin, 15 Chestnut St., taking bids 1 story concrete garage, workshop, Mall and Chestnut Sts. $40,000. J. S. McIntyre, 908 Purchase St., archt.

CONTRACTS AWARDED

Wis., Wild Rose — SHOP and GARAGES — Erni Colligan, 2 story, 60 x 98 ft., brick, steel, rein.-con., to Con. Gmeines & Son Co., Waupaca.

POWER PLANTS

PROPOSED WORK

Ill., Hartford—Village, C. W. Brown, pres. bd., sketches light and power plant and distribution lines.

Mass., Gardner—Commonwealth of Massachusetts, Gardner State Hospital Dpt. Mental Diseases Boston soon takes bids 2 story, concrete, brick, steel power generating plant 2 turbines 4 boilers, stokers, switchboard. $125,000-$150,000. Albert B. Franklin, Inc., 25 Haverhill St., Boston, archts. Noted Mar. 26.

Mass., Taunton—Commonwealth of Massachusetts, Dpt. Mental Diseases, Boston, boiler room improvements, incl. two 250 hp. water tube boilers and brick stack in hospital. $45,000. C. T. Main, Inc., 201 Devonshire St., Boston, engrs.

N. Y., Eltingville—New York & Richmond Gas Co., 691 Bay St., St. George, S. I., 1 story, basement illuminating gas plant, Richmond Ave. and Sycamore St. $40,000 or more. Project abandoned. Private plans.

Wash., Everett—Puget Sound Power & Light Co., F. Walsh, dist. mgr., expending $150,000 during August and September, improvements, installations new equipment at Beverly Park Substation, incl. new unit of four 60 ton transformers, each with capacity 8,333 kva. making 25,000 kva. unit (to supplement present equipment of 7 transformers).

BIDS ASKED

Mass., Roxbury—See "Contracts Awarded."

CONTRACTS AWARDED

Mass., Roxbury — House of Liederman, 169 Norfolk Ave., Roxbury, altering and constructing 1 story, brick, steel boiler plant addition, plain found., Norfolk St., separate contracts. $40,000. P. J. Brown, 51 Cornhill, Boston, archt.

Mass., Westboro—Trustees of Mass. Training Schools, Dpt. P. Welfare, altering and constructing 1 story, brick boiler house addition, at Lyman School for Boys, to F. Losordo Co., 24 School St., Boston. Est. $40,000. Noted Aug. 20.

Neb., Omaha—Douglas Co., G. Berger, clk., concrete, brick power house for new County Hospital, to R. Butke, Omaha, $32,000.

N. H., Concord — New Hampshire State Hospital, W. A. Stone, purch. agt., State House, general contract 1 story, 15 x 45 ft., concrete, brick power plant, to H. E. Noyes, 60 Grove St., Claremont, $3,868 piping, to Lee Bros., Concord, $13,564. Noted Aug. 20.

N. J., Hackensack—Bergen Co. Court House, general contract 1 story, basement, brick, steel central heating plant, plain found., to Potterton Bros., Main St., Closter, $58,800; plumbing, to John Byd Plumbing & Heating Co., 310 Elm Pl., Leonia, $7,250; heating, to Newark Heating Co., 131 South 12th St., Newark, $20,600; electrical work, to Busch Bros., Inc., 101 West Palisade Ave., Englewood, $36,900; steel and iron to Hudson Structural Iron Wks., Inc., Henderson St., Jersey City, $2,699. Grand total, $126,219. Noted July 30.

O., Cleveland—Hughes Provision Co., Wm. Hughes, pres., 3199 West 65th St., 1 and 2 story, 47 x 63 ft., concrete, brick, steel boiler house, to Arthur Thomas, 2431 East 83rd St. Est. $40,000. Noted Aug. 20.

Tex., Corpus Christi—Central Power & Light Co., Alamo Natl. Bank Bldg., San Antonio, 2 story, part basement, 60 x 110 ft., rein.-con., brick plant and office, plain found., to Wood Sherman Constr. Co., Corpus Christi, $45,000.

WAREHOUSES

PROPOSED WORK

Calif., San Francisco—California State Bd. of Harbor Comr., Ferry Bldg., 2 story, rein.-con. storage, paint shop, repair shops, garage, Bryant St. $200,000. F. G. White, Ferry Bldg., engr.

Conn., Greenwich—Doran Bros., 29 Railroad Ave., will award contract about Sept. 15 from bids already taken, 2 story, 52 x 154 ft., brick, concrete storage warehouse, Railroad Ave. $55,000. G. S. Kingsley, 103 East 125th St., New York, archt. Noted June 25.

N. J., North Bergen—Owner, c/o C. G. Eicholz, Jr., archt., 960 Bergenline Ave., 4 story, basement, brick, steel, warehouse and showroom addition, plain found., Hudson Blvd. $150,000. Project abandoned. Noted Aug. 12.

N. Y., Brooklyn—See "Factories and Mills."

N. Y., New York—Kay Moving Serv., 2464 Amsterdam Ave., will let contract early winter from bids already taken, storage and warehouse, 2468 Amsterdam Ave. G. S. Kingsley, 103 East 125th St., archt. Noted July 2.

Wash., Seattle—Albert Bros. Milling Co. bids about Sept. 4, rebuilding 1 story, basement, 150 x 300 ft. fireproof warehouse, foot of Massachusetts St. $50,000. Private plans.

BIDS ASKED

N. Y., Jamaica—See "Contracts Awarded."

N. Y., Long Island City—See "Contracts Awarded."

CONTRACTS AWARDED

Kan., Topeka—Fleming-Wilson Mercantile Co., lessee, 116 Kansas Ave., Santa Fe Land & Impvt. Co., owner, Santa Fe Bldg., 1 story, basement, 160 x 160 ft., concrete, brick, steel warehouse, incl. large refrigeration plant and cold storage room, to Austin Co., 510 North Dearborn St., Chicago, Ill. Est. $100,000. Noted Aug. 13.

Minn., Minneapolis—Minneapolis & St. Louis Ry. Co., Transportation Bldg., R. G. Kenly, ch. engr., 1 story, 18 x 86 x 208 ft. fruit warehouse, steel, concrete hollow tile, 301 North 5th St., to Stahr-Burgum Co., 903 Wesley Temple Bldg. Est. $75,000.

N. Y., Jamaica—General Builders & Supply Corp., 205 East 42nd St., New York, 1 story, 40 x 160 ft. warehouse, 1 story, 30 x 80 ft. garage, both metal, separate contracts. Private plans. Noted Aug. 27.

N. Y., Long Island City—Kalbert Realty Corp., 26 Court St., 2 story storage, store and bowling alley, Fulton and 149th Sts., separate contracts, P. Freshman, 50 Court St., Brooklyn, archt. Noted Aug. 27.

B. C., Vernon—Inland Ice & Cold Storage Co., Ltd., general contract 4 story, 100 x 100 ft., concrete cold storage warehouse, to Dominion Constr. Co., Ltd., 509 Richards St., Vancouver, $40,000; refrigeration, to T. M. Grindley Co., Ltd., 1641 West 2nd Ave., Vancouver, $14,000.

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See proposal advertising on page 95